

# Table of Contents

[Title page](#epub_anchor_start_reading)

[Copyright](#Top_of_c03_information_xhtml)

[Introduction](#Top_of_c04_introduction_xhtml)

[First part. Construction and diffusion of a science of the sphere](#Top_of_c05_part_xhtml)

[Chapter I. The establishment of ancient theories](#Top_of_c06_chapter_xhtml)

[Chapter II. The circulation of knowledge... around the Mediterranean](#Top_of_c07_chapter_xhtml)

[Chapter III. The sphere in the West, from the early Middle Ages... to the end of the Renaissance](#Top_of_c08_chapter_xhtml)

[Second part. History and stakes of a myth](#Top_of_c09_part_xhtml)

[Chapter I. The invention of the flat Earth](#Top_of_c10_chapter_xhtml)

[Chapter II. One myth can hide another](#Top_of_c11_chapter_xhtml)

[Chapter III. Understanding the success of the myth](#Top_of_c12_chapter_xhtml)

[Chapter IV. The maintenance of the myth from the 19th to the 20th century: a small selection](#Top_of_c13_chapter_xhtml)

[In conclusion](#Top_of_c14_conclusion_xhtml)

[Appendix](#Top_of_c15_annexe_xhtml)

[Bibliography](#Top_of_c16_biblio_xhtml)

[Index of people mentioned](#Top_of_c17_append_xhtml)

[Completed scanning](#Top_of_c19_append_xhtml)



2021, Les Belles Lettres Publishing Company   
95, bd Raspail, 75006 Paris

[www.lesbelleslettres.com](http://www.lesbelleslettres.com/)

ISBN : 978-2-251-91703-0

Introduction

It seems to be universally understood, or almost: "in the Middle Ages, people thought the Earth was flat". The idea is so widespread today that the expression has become the emblematic illustration of the scientific backwardness that, incomprehensibly, we continue to attribute to the Middle Ages and of what we believe to be the narrow-minded stupidity of an ancient world, with which modernity would have broken. One hears it from journalists, various intellectuals, students and, more seriously, from many teachers, who continue, out of ignorance or comfort, to propagate a theory that all specialists in the history of science and intellectual life have known for a long time that it is an invention, probably intended to better consolidate the triumph of modernity. For several decades now, studies have shown to what extent the flat Earth theories were in fact marginal. The most famous and comprehensive work devoted to this myth is that of the historian J. B. Russell, Inventing the Flat Earth, Columbus and Modern Historians, published on the eve of the five hundredth anniversary of the "discovery" of theAmericas[1](#1__Nous_donnons_l_ensemble_des_r). It has not been translated into our language, but has given rise to numerous articles readily available in French. More recently, a large collective work has taken stock in a very complete way of all the knowledge related to the Earth in the Middle Ages, by providing many documents, without failing to be astonished by the persistent persistence of this myth that has no foundation[2](#2__Gautier_Dalche__2013). However, the general public, and even the majority of the scholarly public, has hardly been touched by these works. A Minister of Education was thus able to write :

Almost all Greek knowledge gradually disappeared, as well as the idea of the Earth's roundness, the most symbolic of all, which was replaced at the beginning of the fifteenth centuryby that of a flat Earth (whereas Eratostheneshad determined the radius of a spherical Earth 100 years before Christ)[3](#3__Allegre__1997__p__205).

More worryingly, an eminent French physicist, director of research at the CNRS, wrote in an article published in Le Monde on February 6, 2007: "When Galileoconcluded that the Earth was round, the unanimous consensus was against him, agreeing on the flatness of the Earth. But he had the demonstration of his conclusion[4](#4__Galam_____Pas_de_certitude_sc)"which shows the influence of this legend even in a very educated part of the population.

Moreover, the idea of the medieval belief in a flat Earth is often, in the mouth of those who use it, an indication of the certainty of the advanced and "progressive" character of our time (its mention is still regularly accompanied by a distressing reference to the supposed "medieval obscurantism") and of their contempt for a world where, they think, burned those who believed in the earthly sphere as well as witches, excommunicated doctors who practiced dissection and where women had no souls. It has also become a kind of argument of authority supposed to prove that one can be right alone against all. Even recently, Marlene Schiappadeclared in January 2019 on RMC: "I remind you that Galileowas all alone against the majority to say that the Earth was round and that it turned. The majority thought it was flat and static." Static yes, flat, certainly not.

These are only the visible signs of an almost general ignorance on this subject. Many are those who propagate in good faith this myth that has become a topos: let's quote, for example, this article from Le Parisien of April 6, 2017 on "The return in force of the flat Earth theory." Subtitled "A debate as old as the world and which seemed settled for many people emerges from beyond the grave", it begins with these inevitable words: "Is the Earth really round? If you thought the debate had been settled by Galileoand many others, you are mistaken." The error, in the journalist's mind, is not about Galileo's role. And we note the caution of the "and many others", an indication of the obvious lack of precise knowledge about the history of theories about the shape of the Earth.

Small surveys conducted regularly over the years among students of literary degrees as well as those with a scientific component, and students of master's degrees in the history of science, allow us to measure the influence of this commonplace, which is nevertheless regularly denied by historians of science and, increasingly, by numerous, sometimes well-documented, Internet sites. Depending on the year and the course, between two thirds and three quarters of the students surveyed answered "yes" to the question "In the Middle Ages, did people believe that the Earth was flat[5](#5__Le_dernier_sondage_pratique_a) ? ". One of them specifies that Galileowas "burned at the stake" for having put forward the hypothesis of sphericity, mostly attributed to the Pisan scientist or to Copernicus, sometimes to both (almost a century apart), more rarely to Christopher Columbusor Magellan.Worse still, among those who answer "no", thus seeming to know that the sphericity of the Earth is a long-standing fact, several impute the discovery of this sphericity to... Copernicusor Galileo, which shows a singular lack of chronological reference points Finally, among those who answer "no", almost no one is able to say precisely when the recognition of sphericity dates back to, nor to cite a name or an authoritative work on this subject. In five years of repeated surveys, the most accurate answer was "from the Greeks" (once, a student answered "Aristophanes", probably - one hopes - thinking of Aristotleor Eratosthenes)

But not only is the idea that the Middle Ages believed that the Earth was flat historically false, but it is also a manipulation of the history of science, and especially of consciousness, and it is part of a poorly linear and teleological vision of the development of civilizations, stemming from positivism and the idea of progress defended since the 18th and especially the 19th centuries. It is indeed very easy to invalidate: it is enough to open a book of astronomy from the Middle Ages, books that the digital era, after that of printing, has made very easily accessible, and that one could already find in a 19th century library. However, it remains the majority opinion, and it is from this observation, made almost daily in our lives as teachers and researchers in the history of science, that the idea for this book came. Its aim is not so much to re-establish an elementary scientific truth (this one is easily verifiable elsewhere) as to make it known, and especially to put at the disposal of the readers a certain number of documents (texts and illustrations) allowing them to understand quickly and simply the real history of the representations of the Earth, as well as the history of the myth of the flat Earth. This book will also allow them to have easily at hand proofs, usable for example in a pedagogical context: we provide for this purpose a bibliography of sources in modern editions, another of quoted studies and critical works allowing all those who want to deepen the question to read more advanced research works on the question.

We also wish to reflect on the causes of the perpetuation of this legend, in a context where the notion ofcognitivebiasand the reflection on the circulation of untruths are particularly relevant Why has this myth had such a long life and continues to be so successful? We will try to answer these questions by drawing everyone's attention to the need to always doubt and question even what seems to be a given truth. It will also point out some typical methodological problems: in the Middle Ages, "we believed that the Earth was flat". But who is "we"? What environment should be taken into account when asserting the validity or otherwise of a scientific theory? The academic and educated milieu or the illiterate milieu? A study of the history of science is not an analysis of the popular beliefs of an era; even today, some people believe that the Earth is flat, and a survey conducted in December 2017 byConspiracy Watch and Ifop for the Fondation Jean-Jaurès seems to show that nearly 10% of those surveyed believe "it is possible that the Earth is flat." The results of this survey of 1,252 people conducted as part of a "Survey on Conspiracy" have been widely publicized, but the rigor of their exploitation has sometimes been questioned. Thus the rate of those who agree with this thesis is probably closer to 2% than to 10%. In any case, can we affirm that in 2017, "we" believed that the Earth was flat? Should we base what we "know" on academic teaching or on individual beliefs? These types of questions will also underlie our discussion.

We propose to the reader a journey in two stages. In the first part, we give the precise elements, sometimes accompanied by illustrationsthat allow us to answer the three questions "Who believed that the Earth was flat and why?", "What was known in learned circles in the Middle Ages and then in the period from Columbusto Galileo?", "What elements of learned knowledge were disseminated outside of scholarly circles?Since Greek antiquity, the number of scholars, schools, religious institutions, and scientific works that have defended the idea of a flat Earth can actually be counted on the fingers of one hand, and it can be said that the Earth, since Platoand Aristotleat least, has never been flat What exactly are the cosmographic theses that circulated during late antiquity, and in the Arab-Muslim world? Which ones were transmitted to the Latin Middle Ages? What is their value in terms of scientific authority, their importance in the eyes of intellectuals, their diffusion? We then study the way in which this spherical representation of the Earth circulated throughout the Middle Ages in the West, and what were its developments. We do not propose an exhaustive history of theories on the shape of the Earth, even less a history of astronomy or geography; our work is not a research work (very complete works are available elsewhere): We would rather like to try to answer the questions posed above and to disprove some commonplaces (Greek theories were lost, knowledge was dominated by the biblical vision...), by giving significant examples of the theories that circulated, of the levels of knowledge (academic or broader) and of the modes of diffusion of this knowledge. show that, contrary to what one may sometimes read, Greek knowledge was not lost, that astronomycontinued to be consolidated on Greek foundations, supplemented by the Arab contribution and observations specific to the European world, that sphericity was indeed the official doctrine taught in universities and was not condemned by the Church, and finally that these notions were also known outside universities and used, for example by navigators

In the second part we track down the authors of the myth - quite recent after all - attributing to the Middle Ages the belief in a flat Earth. We question the intellectual motivations that may have been theirs, the ideological framework in which they were embedded. Here again, we propose elements of response that have not all been explored by Russelor Patrick GautierDalché, and we illustrate the point with extracts from texts A subsidiary question is indeed necessary: We will try to answer this question in order to provide tools for reflection to readers, teachers, and popularizers, for a broader reflection on the circulation of errors at a time when such debatable notions as "post-truth", "alternative truth", or "alternative facts" seem to be imposed.

At the beginning of this book, a preliminary clarification seems essential: a collective work published about ten years ago - Galileo Goes to Jail and Other Myths about Science and Religion - has taken stock of a series of myths illustrating the "conflict between science and religion", as presented in their time by Draperand Whitein the United States (see Part II, chap. 3).While many of the myths are relevant, others are exaggerated and the treatment of the question is clearly biased:the publication of this book, though published by Harvard Press, is supported by an American foundation, the John Templeton Foundation, which apparently pursues another goal than the re-establishment of scientific truths For Guillaume Lecointre[6](#6__Lecointre__2012)This foundation seeks to "blur the epistemological boundaries of legitimacy between religion and science" and promotes a reconciliation between the two, which is absolutely not the aim of the present work. We do not conduct here an investigation of the eminently complicated relations of religion(s) with science. We do not seek to "rehabilitate" anyone or anything. But among the myths linked to the flat Earth is that of the opposition of the Church; wanting to treat it in a scientific way as we intend to do has nothing to do with proselytism. It is obvious to us that religion has been able to hinder scientific activity during certain periods, that the latter has been able to develop in the shadow of the former during other periods, and that these questions deserve a work which is not the object of our work. And it is also obvious that the religious beliefs of a scientist, no more than his atheism, are not a guarantee of the scientific value of his research. We will try to demonstrate that it is the ideological constructions at work in the rewriting of the history of science that we must be wary of.

Notes

[1](#1). We give all the references of the critical works as well as those of the sources used in bibliography, at the end of the work, and will give in note only the reference to the page.

[2](#2). GautierDalché, 2013.

[3](#3). Allègre, 1997, p. 205

[4](#4). Galam, " Pas de certitude scientifique sur le climat ", article published inLe Monde on February 6, 2007.

[5](#5). The last poll taken at the beginning of the 2018 school year yielded 17 "yes" (we thought the Earth was flat), 6 "no" and 2 "don't know" among the 25 students in a mixed literary and scientific degree, and 24 "yes" and 12 "no" for the 36 students in the Modern Letters degree 3.

[6](#6). Lecointre, 2012.

FIRST PART

Construction and diffusion of a science of the sphere

CHAPTER I

The establishment of ancient theories

To explore ancient theories, the historian has only textual or iconographic sources, and only those that have been preserved. In the absence of a polling institute that could cross the centuries, we do not have access to the opinions of the peasant of the second century B.C. or the baker of the fifth century A.D. We have mainly, for the periods we are going to discuss, the productions of a small category of people, often privileged, always erudite. If the manuscripts have been copied and transmitted, if they have managed to escape oblivion, wars and natural disasters, this often testifies to the fact that they were important to a school of thought, to the disciples of a scholar or to the institutions that preserved them, but it can also be the result of chance. The corpus of surviving texts does not guarantee completeness, but it does provide a reliable basis for determining what was known or believed in the world of scholars and institutions of learning.

# I. THE GREEK THEORIES OF THE SPHERE

The sphere of the philosophers

Before mentioning the authors who defended the idea of a flat or non-spherical Earth, it is probably useful to situate the pivotal moment when the idea of the terrestrial globe - with different nuances - was imposed. The cosmographic knowledge that irrigated our Middle Ages began to be built, for the most part, around the Mediterranean and in the Greek world. It came from the first science, philosophy, and from astronomy. They were used very early on by explorers and later contributed to the birth of a new science, geography.

The two great thinkers of antiquity, Plato(428-348 B.C.) and Aristotle(384-322 B.C.), already considered the Earth as a spherePlato, in theTimaeus, explains that the World is spherical and animated by a uniform circular motion around its center, the Earth:

Also it is the figure of a sphere, whose center is equidistant from all the points of the periphery, a circular figure that he [the demiurge] gave him as if he was working on a lathe, a figure which among all is the most perfect[1](#1__Platon__Timee__33a).

The Earth is "wound around the axis that runs through the whole[2](#2__Ibid___40b)"the axis that runs through the universe and around which the sky turns. In the Phaedo, hespecifies that in order to hang "in the center of Heaven", the Earth needs "neither air nor any such resistance"[3](#3__Platon__Phedon__108e_109a__p). The explanation of this phenomenon probably predates Platobecause, according to Aristotleit was already found by Anaximander(c. 610-c. 546 B.C.), who maintained that "the Earth remains at rest because of indifference[4](#4__Aristote__Traite_du_ciel__295)"In other words, the equilibrium linked to the immobility that everything finds when it is at the center, because it has no more reason to go in one direction than in another. To put it trivially, everyone notices that when an object falls on the ground, it stays there.

For Aristotle, the world is spherical, and more precisely made up of spheres nested withinAt the center, the so-called sublunar world (located under the orb of the Moon) is made up of the four elements, whose natural locations form four concentric spheres ordered according to what can be translated as their "heaviness" (gravitas), since the concept of gravity does not exist: earth, water, air, fire, from the center to the periphery. It is surrounded by the supralunar sphere, consisting of a fifth element and divided into celestial spheres each carrying the stars known at that time (in order from the earthly vision: Moon, Sun, Mercury, Venus, Mars, Jupiter, Saturn), until the eighth of them, which carries the fixed stars.

The arguments demonstrating the sphericity of the Earth are found in the Treatise on Heaven[5](#5__Voir_tout_ce_qui_concerne_l_e)and are essentially linked to the two Aristotelian conceptions ofnatural place and motion: all the parts of the element earth, the heaviest element, naturally fall towards the center of the Earth, which is the center of the World and the place where the "grave" come to rest If the parts "fall from all sides to a single center", the figure of the Earth is necessarily a sphere. Aristotledemonstrates this by the following reasoning:

As for its shape, it is necessary that it be spherical. Indeed each piece of earth has a gravity until it reaches the center, and the smallest being pushed by the largest is not likely to form a surface in waves, but rather to press against it and unite with it, until they reach the center[6](#6__Aristote__Traite_du_ciel__297).

He then invokes the sensitive evidence, and first the argument of the lunar eclipse, called to know a beautiful longevity :

Moreover, there are also the phenomena captured by perception. Indeed, < if the Earth were not spherical > the eclipses of the Moon would not have these kinds of sections: in fact, in the figures that it takes every month, the Moon presents all the divisions (straight, biconvex, concave), but during the eclipses the line that limits the Moon is always convex, so that, since there is an eclipse because of the interposition of the Earth, it is the circumference of the Earth that, being spherical, is the cause of this figure[7](#7__Ibid___297b25_30).

The shape of the shadow cast by our planet during lunar eclipses is a visual confirmation ofsphericity: when the Earth is interposed between the Sun and the Moon, the three stars being aligned, we observe on the surface of the Moon the displacement of the Earth's shadow, the edge of which draws a circle.Aristotlealso notes that "if we make a small displacement in the direction of the south or towards the Great Bear, the circle of the horizon obviously becomes different, so that the stars above our heads undergo a great change[8](#8__Ibid___297b30_298a1)".

Aristotleis first and foremost a philosopher who seeks to demonstrate the coherence of his system, but even though he does not use experimental evidence in the sense that we understand it today, he firmly establishes the sphericity of the Earth by reason and observation Further on, he states that "all mathematicians who endeavor to calculate the circumference of the Earth arrive at the figure of forty myriads of stages[9](#9__Ibid___298a15_20)". The value of the Greek stadium is debated, but these 400,000 stadia are probably about twice the actual circumference. This figure is used by Aristotle to reduce the importance that the ancients had given to the Earth in relation to the rest of the World, considering it "a large part of the whole". The shape of the Earth, Aristotle concludes, is "circular [...] and it is that of a sphere which is not enormous".[10](#10__Ibid___298a5_10).

Here he contradicts Platowho was convinced "that the Earth is a very big thing", and specified, concerning the area inhabited by men (the oecumene): "we inhabit a small part of it [...],living around the sea like ants or frogs around a swamp" Plato did not think that the Mediterranean - this swamp - was the only inhabited part of the Earth, because he specifies that "elsewhere a multitude of other people live in a multitude of other similar places and that many other people live elsewhere in many similar places".[11](#11__Platon__Phedon__109b).

The fact that part of the earth is emergent may seem to contradict the theory of concentric elementary spheres, but Aristotleexplains this in his treatiseOn Generation and Corruption by specifying that "each element is principally and for the most part of itself, in the place that is proper to it[12](#12__Aristote__De_la_generation_e)". Tangible earth (which is not the pure element) is mixed with water because, without moisture, it would not have "the power of cohesion" and would disintegrate. It is therefore only "mostly" under the sphere of water and only its dry part emerges[13](#13__Ibid___335a1). Alexanderof Aphrodite, a great commentator of Aristotle in thesecond century AD, whose words are reported by Simpliciusin his own commentary onAristotle's Treatise on Heaven, explained this point of the Aristotelian thesis by invoking the heterogeneity of the Earth and the necessary distinction between its "center of weight" (center of gravity) and its "center of magnitude" (geometric center)[14](#14__Duhem__1913__t__IX__chap__16). This question is also explained by the very existence of life: in the biological order of things, the element is in reality never at restin its natural place The interlocking of the elementary spheres is purely theoretical: in the living, the conglobation of earth, water and, partially, air, is effective. The study of elementary exchanges is the subjectMeteorological treatise, in which Aristotle deals with tangible inanimate matter and its transformations under the orb of the Moon.

## The sphere of the mathematician astronomers

Alongside the philosophers of nature, other scientists produced texts dealing with the shape of the Earth: the astronomers, who are also mathematicians, like those whosemeasurementsAristotleevokes They are astronomers, sometimes astrologers (contrary to another popular belief, one does not confuse astronomy and astrology), geometers, sometimes even music theorists and geographers. The hierarchy of disciplines as formalized by Aristotle, which has lasted for nearly twenty centuries, confines mathematics to the study of those objects that can be separated from physical bodies by thought, i.e. "the even, the odd, the straight, the curved[15](#15__Aristote__Physique__194a)"whereas philosophy is the science of the elements and their essence. As far as the sky is concerned, therefore, mathematical astronomy studies the positions and movements of the heavens, whereas the philosopher is concerned first of all with the matter of the heavens and the world, as well as the causes of their movements.

Eratosthenes(276-194 BC) was thus, according to later commentators, a poor philosopher, but he became a mathematician (and director of the library of Alexandria)Convinced, likemost scientists of his time, of the sphericity of the Earth, he is the author of a particularly astute method of determining the Earth's radius, which we will detail later However, this method is not the first one. We have traces of the one of Eudoxeof Cnidus in the4th century BC(probably the one whoseresultAristotlecites), that of Dicearchusof Messina, a disciple of Aristotle who lived between thefourth and third centuries, and that of Archimedes, another famous mathematician whom Eratosthenes met in Alexandria and worked with

The Treatise on the Measurement of the Earth by Eratosthenesnot come down to us, but we can reconstruct its demonstration thanks to several authors who copied or commented on its presentation.In the appendix, we detail the version reported by Cleomedes, author of a cosmology manual dating from the first centuries of our era The principle is as follows: by measuring, on a summer solstice day, the length of the shadow of a stick stuck vertically in the ground in Alexandria, one can calculate the difference in latitude between this city and that of Aswan (formerly Syene), situated on roughly the same meridian. Aswan is on the edge of the intertropical zone, the one where the Sun passes at least once a year at its zenith, on the day of the summer solstice. On this day, a stick planted there casts almost no shadow and one can observe the reflection of the Sun at the bottom of a well on the nearby Elephantine Island, which never happens in Alexandria. Eratosthenes' reasoning is geometric and is based on two related hypotheses: the first is that the Sun is so far from the Earth that the rays that reach us are almost parallel. The second is that the difference inlength of the shadows can only be explained by the curvature of the Earth's surface.

The result obtained by Eratosthenesthen used by many authors in the following centuriesIt shows that the portion of the meridian between Syene and Alexandria represents 1/50th ofthe circle.The surveyors of King PtolemyII had measured the distance between these two cities with relative accuracy: 5,000 stadia Eratosthenes therefore assigned the value of 250,000 stadia to the circumference of the Earth, a value that he "rounded off" to 252,000 stadia in order to make it easily divisible by 60, since he was dividing the circle into 60 parts and not into 360 degrees as was done later[16](#16__Voir_Roller__2010). Depending on the value given to the Greek stadium - which we discuss in the appendix - the mathematician obtains a result more or less close to the real value (40,000 km), but in any case an excellent order of magnitude of it. It is interesting to compare this approach with that of Anaxagoras(5th century B.C.), who had a completely different cosmographic model since he imagined the Earth to be flat and much closer to the Sun; the rays emitted by the latter could not be parallel and diverged. Using the same observations on shadows and a similar calculation, he estimated the distance between the Sun and the Earth at... 40,000 stadia.

Eratostheneswere widely disseminated and discussed in the following centuriesThey were redone by the Syrian astronomer Posidonius(† 57 B.C.), who measured the difference in latitude between Rhodes and Alexandria by comparing the height of the star Canopus in the sky at these two places, which he assumed were 5,000 stadia apartHe found, as Cleomedes, that "the great circle of the Earth is two hundred and forty thousand stadia", a result inferior to that of Eratosthenes[17](#17__Cleomede__Theorie_elementair). These measurements are also commented on by Hipparchus(2nd century B.C.), who admits them, by Strabo(1st century B.C.), who admits them while criticizing the geographical surveys of his predecessor[18](#18__Voir_l_introduction_de_D__R)and by Ptolemy(2nd century AD). They were then transmitted to late antiquity and the Middle Ages by the works of Theonof Smyrna (2nd century AD), Macrobius(4th century), MartianusCapella (4th-5th century). Finally, we will examine other procedures that were devised in the Arab world during the reign of the Caliph al-Ma'mūn(9th century).

All these authors share the opinion that the Earth is spherical. The list we have just enumerated is not exhaustive. We have only quoted those whose works circulated in the medieval Latin world and constituted the scientificcorpus of educated men until the Renaissance.We will see that the different results they contain are still hotly debated on the eve of Columbus, but not sphericity

## The explorers' sphere

Alongside established scientists, explorers - some of whom were great scholars - also gave us their image of the Earth, even if they rarely left written records. The discoveries ofPytheas, a navigator from Marseilles in thefourth century BC, were cited by Dicéarquede Messine, whose words were reported by Strabo[19](#19__Strabon__Geographie__II__4)and Plinythe Elder, and some fragments of hisTreatise on the Ocean have come down to us. Pytheas does not seem to have crossed the columns of Hercules like his compatriot Euthymenaeus, who had sailed along the African coast in the5th century in search of the sources of the Nile. Pytheas writes that his journey took him from Gades (southwest of the Iberian Peninsula) to Tanais - that is, the mouth of the Don River in the Black Sea. He therefore abandoned navigation several times to cross land. This journey, which took place around 320 BC, allowed him to go beyond the British Isles to Thule, the present Iceland, and to reach 63 degrees of north latitude according to him. He was one of the first Mediterraneans to have observed a polar summer night. Pytheas' voyage took place during the expansion of Alexander's empire, and the geographical data he brought back are mentioned by later authors, who tried to measure the inhabited part of the Earth and to locate precisely remarkable sites, like Eratosthenes, Hipparchusor Posidonius. The latitude measurements he made with a gnomon, up to the vicinity of the Arctic Circle, are interpreted within the framework of the Aristotelian model of a spherical Earth. Pytheas, if he was not a scientist in the traditional sense of the term, was endowed with a solid astronomical culture and he discovered moreover that the axis of the world does not pass exactly by a "polar" star but by an empty zone of star[20](#20__Voir_l_etude_tres_complete_d).

The abundant sources on Plato, Aristotleand Eratosthenes, and the few sources on Pytheas, make it possible to situate the affirmation of sphericity in the Mediterranean world between the5th and 4th centuries B.C. It is more difficult to know in what terms philosophers or astronomers prior to this period defended this opinion. DiogenesLaërce writes, inThe Life of Pythagoras, that this mathematician of thesixth century B.C. already described the Cosmos (a word he would have invented) as spherical, as well as the Earth. According to him, the Pythagorean philosopher of the fifth century Parmenidesalso thought the Earth was spherical, which is confirmed by other authors[21](#21__Martin__1878__p__311). It is therefore reasonable to say that the idea of sphericity is 2,500 years old. The first known measurements of the radius of this sphere took place in the 4th-3rd century BC. The affirmation of sphericity was essentially the product of a philosophical conception of our cosmos, of its harmony, of the hierarchy of the elements that constitute it, and of the notion of place - the Earth and its center being the very place of equilibrium, and therefore of immobility. However, very easy observations such as those of lunar eclipses or the variation in the elevation of stars according to latitude confirmed this model, which was not detached from observation. This is an important difference with another astronomical question, often confused with that of the shape of the Earth: the question of motion, which no simple observation can detect. The reader can observe for himself that he does not feel the movement of his planet, and that if he raises his head and observes the phenomena, experience will teachin a deceptive way that the Sun revolves around him

# II. THE OTHER FORMS OF THE EARTH

The representations of the pre-Socratic thinkers were not known in the early Middle Ages, because they were transmitted by the criticism made by the philosophers and in particular that of Aristotle, whose work was only translated from the12th centuryonwardsThe other sources that allow us to know them are fragile and the testimonies they contain are contradictory (DiogenesLaërce, Stobée).Aristotle gives some indications in hisTreatise on Heaven, where he mocks the defenders of the flat form of the Earth, like Xenophanes(6th century B.C.) who thinks moreover "that it is infinite downwards[22](#22__Aristote__Traite_du_ciel__29)and even that it "takes root" in this infinity, or Thales, who makes "rest the Earth on water[23](#23__Ibid___294a28)"whereas for the Stagirite, water is lighter than the earth and cannot be found underneath. Aristotle adds Anaximenes(6th century B.C.), Anaxagoras(5th century B.C.) and Democritus(5th-4th century B.C.) to this list of proponents of the Earth-disc. They have in common, according to him, to explain by the flat shape the fact "that the Earth remains at rest[24](#24__Ibid___294b15)"This supposed immobility of the Earth is, on the contrary, used by Aristotle as an argument to demonstrate sphericity.

Studies cross-referenced with data from later Greek literatureconfirm that Anaximenesand Anaxagorasconsidered the Earth to be a diskThe conception of Democritusseems slightly different; some authors evoke the shape of a tambourine or a bowl, in any case a concave disc whose center is lower than the edges, which makes it possible to account for the differences in length of the shadows according to the places[25](#25__Martin__1878__p__245). Older representations are even more difficult to identify. For example, one of the passages in the Iliad that some people use to prove that Homerconsidered the Earth to be a flat, circular surface is a description of Achilles' shield forged by Hephaestus. This shield represents not only the Earth, but also "the sky and the sea, the tireless sun and the full moon, and all the stars with which the sky is crowned[26](#26__Homere__Iliade__chant_XVIII)", as the following verses state. The status of these poetic and symbolic representations must be taken into account, for they are far from being assimilated to theses of cosmology or astronomy. Other passages, however, confirm that Homer probably believed the Earth to be flat and surrounded by the ocean, at the edge of which the sky (the upper hemisphere), the Earth and Tartarus (the lower hemisphere) merged. However, no one in the Middle Ages or the early Renaissance considered Homer as an astronomer whose theories could be taught, nor did they take him as a scientific model.

# III. STABILIZATION OF THE CONCEPT OF SPHERICITY

The Aristotelian-Ptolemaic model

The philosophers and astronomers of late antiquity widely disseminated the Aristotelian model and the measurements of Eratosthenes. This model, however, did not originate from a scientific approach as we imagine it today. For the Pythagoreans, who undoubtedly inspired it, the harmony of the sphere prevailed over any other argument. For the philosophers of nature, it is a global conception of the cosmos and its center. Cleomedes, more a compiler of the theses that preceded him than an inventor, reports in hisElementary Theory written at the very beginning of our era[27](#27__La_datation_de_l_ouvrage_de) that one must be wary of appearances and that it is advisable to give priority to deductive reasoning:

No doubt sight itself seems to indicate that the World is a sphere. However, this is not the criterion for determining the shape of the world, for it is not true that all things usually appear to us as they are. It is therefore necessary to pass, according to an obvious logical sequence, from what is clearer and what appears to us obviously to what does not appear immediately[28](#28__Cleomede__Theorie_elementair).

only after having demonstrated the impossibility of the Earth being anything other than a sphere that he mentions thepositive arguments in favor of its sphericity The first is the fact that not all peoples observe the same stars, nor the same elevation for the pole (the polar star). The second is the observation made by sailors approaching a land whose "view first meets the peaks, while the rest is obscured by the convexity. On a ship, one climbs to the top of the mast to see into the distance and "when a ship moves away from the land, it is first the nave that is hidden, while the mast and its rigging still remain visible".[29](#29__Ibid). These arguments confirm the transmission of the philosophical approach mentioned above; such a position was widely shared, as evidenced by its exposition in a work used as a manual during the first centuries of our era, as Richard Goulet points out in his presentation of the translation of the text.

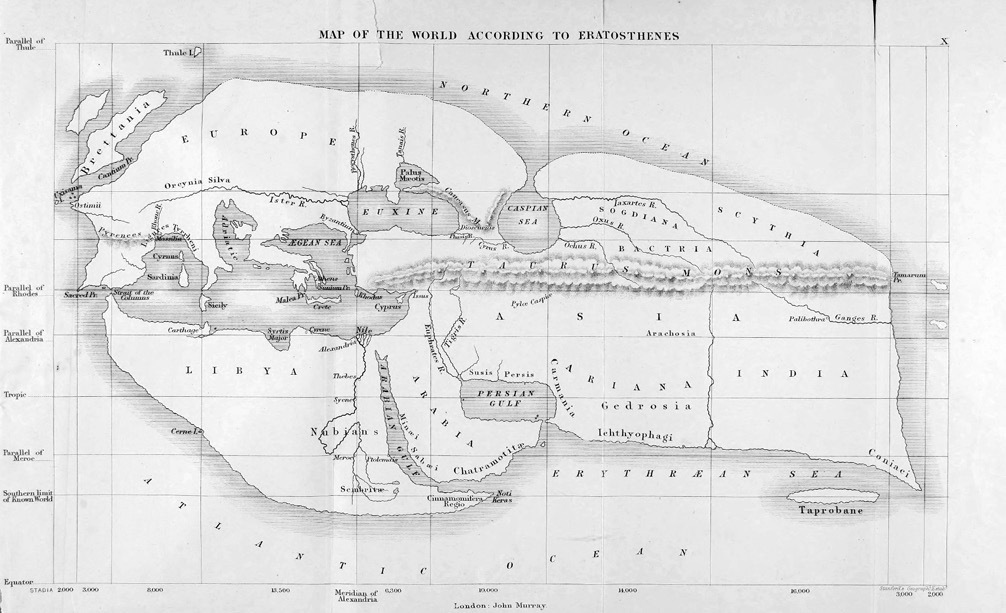
During the five centuries that followed Eratosthenes- from the3rd century BC to the 2nd century AD - the philosophers and astronomers of the Greek world used this corpus.Dicearchusof Messina, Hipparchus, Posidonius, Strabo, Cleomedescriticize, from century to century, the measurements of their predecessors, use more or less explicit mathematical demonstrations, mention with variable details observations of eclipses or the curvature of the sea They all share the same conception of the Earth and the world as spherical.

## The contribution of geography; the maps of the oecumene

Another science, geography, has contributed to the stabilization of the conceptions of the Earth. Theoldest Greek map that has come down to us was drawn by Anaximanderof Miletus in thesixth century BC and represents the whole of the inhabited Earth, organized around a center, which is Delphi. The Earth is represented as a flat disk. In the 4th century, Eudoxusof Cnidus, convinced of the sphericity of the Earth, explored the determination of the coordinates of places in longitude and latitude.His successor Dicéarque- who took up his evaluation of the earth's circumference at 400,000 stadia - established the length and width of the inhabited area, this time centering his world on RhodesDicéarqueis also known to have developed a geometrical procedure to determine the height of the mountains: his goal was to relativize the latter; it seems that he wanted to convince of their error those who persisted in the idea that the disappearance of the Sun, at night, was due to the mountains which surround the flat disk of the Earth[30](#30__Keyser__2001__p__354_et_361). This would mean that the idea of a flat Earth was still present at the end of the fourth century B.C. or the beginning of the third.

Eratosthenesis the author - in addition to his work on theMeasurement of the Earth - of a treatise on geography in three volumes, lost since the first centuries of our era and of which Strabo, a geographer of thefirst BC, Greek by culture and subject of the Roman Empire, has transmitted most of the fragments (about a hundred) that are available to us today.The work was previously used in antiquity by Hipparchusand Polybius.Strabo reports, to criticize it, the position of Eratosthenes questioning the"scientific"valueof the poem of Homerquoted, which "aims to captivate and not to instruct" and whose geographical information is "the wonders of the fable"[31](#31__Strabon__Geographie__t__I__2). If Strabo praises "the recourse to mathematical and physical hypotheses" of the Alexandrian scholar as well as the "legitimacy" of the spherical shape of the Earth[32](#32__Ibid___4__1__p__167)but he considers that the demonstration of this sphericity is too long and deviates from the subject. He contests the assertion of his predecessor according to which "it would be possible for us to go by sea from Iberia to India" by following the parallel of Athens. The reasons of this dispute are not clear, but it seems that it is the existence of a possible second inhabited world in our temperate zone[33](#33__Ibid___6__p__171). Strabo also criticizes the credit that Eratosthenes gives to the information reported by Pytheason Thule, because the navigator from Marseilles "was recognized for a liar" and "those who visited Brittany" (present-day Great Britain) "say nothing of Thule" (present-day Iceland)[34](#34__Ibid___3__p__168).

interesting to note, for the understanding of Eratosthenes, that he compared the shape of the inhabited area to a chlamydia (a Greek trapezoidal coat with rounded edges) or to a half-artichoke This trapezium is divided by a parallel at the supposed common latitude of the Taurus Mountains and Gibraltar, and by a meridian at the longitude of Alexandria, the two lines crossing on the island of Rhodes. It is bounded to the south by the torrid zone, supposedly uninhabitable, to the north by the frozen zone, andis much larger in longitude than in latitude, hence the origin of the word "longitude" The world maps of Eratosthenes were reconstructed by integrating latitude measurements and longitude estimates of notable places, a world centered on the temperate zone and extending nearly 80,000 stadia in longitude. The demonstration was made that this term "chlamydia" does not claim to describe the shape of the oecumene[35](#35__Zimmermann__2002)The demonstration was made that this term "chlamydia" does not claim to describe the shape of the oecumene, but that of the map that represents it, so that it follows the three-dimensional shape of the terrestrial sphere on a part of the northern hemisphere (a third), limited to the north by the polar circle and to the south by the equator.



Map of Eratosthenes[36](#36__Carte_d_Eratosthene_reconsti)

Strabo- in his ownGeography, a monumental work in ten books - compiled and criticized all the geographical observations of the scholars who preceded him. He thus contributed to our knowledge of the conceptions of the older Greek scholars whose manuscripts have not reached us. Strabo's work, however, is little quoted by the astronomers or geographers of the following centuries, and not at all by the most famous of them, Ptolemy.There are a few mentions in thefifth century in Byzantium, a time and place where the manuscript was copied and then dismembered and reused for other purposes. It was only in the 19th and 20th centuries that it was reconstituted as a whole.

In the century following Straboone work had an interesting posterity for our study, that written by Dionysiusof Alexandria (117-138 AD)TheDescription of the Inhabited Earth (or Periegesis) is a poem of 1,187 verses that brings together the knowledge of his time, the systems of Posidonius, Eratosthenesand the Hellenistic cartographers, while quoting older texts (Homer, Herodotus)It has been translated and commented by Christian Jacob.As Marcel Detiennein the preface to this translation, this poem met with great success and circulated throughout the Greco-Roman worldOnce translated into Latin in thefourth and sixth centuries, it was also used in the Byzantine world and was even printed as early as 1470. It was taught until the sixteenth and seventeenth centuries at Oxford, although America must then be added to "the land island, sling-shaped and surrounded by the sea, left by Denys[37](#37__Detienne__preface_de_La_Desc)". Indeed, from the very first lines, Denysevokes the shape of this oecumene which he considers as a unique island:

Beginning to sing the earth and the vast sea, the rivers, the cities and the innumerable tribes of men, I will evoke the Ocean with its deep course; indeed it surrounds with its crown the whole earth, like an immense island; far from being in its whole quite circular, on both sides, it advances in point towards the ways of the sun, similar to a sling[38](#38__Denys_d_Alexandrie__ibid___p).

This representation of the oecumene by an oblong shape, "in point", i.e. elongated on the east-west axis and surrounded by the ocean that surrounds it (or crowns it), is common to many representations of Antiquity and continued until the Middle Ages. It is not, for the scholars of the time, a representation of the Earth, but of its only inhabited part.

Ptolemy, mathematician and astronomer, is also the author of aGeographika that became one of the most widely read works of the late Middle Ages, when it was translated into Latin from Arabic versions (the Greek manuscripts being lost, except for one, which was copied in Byzantium around 1300).Ptolemyconsidered that the inhabited world occupied a quarter of the globe, i.e. half of the northern hemisphere (180 degrees of longitude), which is higher than the estimates of Eratosthenes(140 degrees) He used the so-called "round-the-world" accounts, i.e., the round-the-world journeys across the land, or the tours of the Mediterranean with excursions into the Pont-Euxin (the Black Sea) or the Red Sea[39](#39__Aujac__1993__Ptolemee__Geogr). Distances are most often measured in days of walking or sailing If latitude measurements are relatively easy to make with a sextant, those of longitude pose, as we have seen, a great difficulty to the explorers of the time, because it is necessary to be able to compare a local clock with a reference clock. why Ptolemy, like StrabofavoredHipparchus, which he considered reliable, although too rare Hipparchus had in fact developed the use of astronomical observations such as the comparison of the time of an eclipse between two distant landmarks in longitude and located on the same parallel. In the first pages of hisGeography, Ptolemywrites:

One lacked [...] also a sufficient list of eclipses of Moon observed at the same time in various places, like the eclipse that one saw in Arbels at the fifth hour and in Carthage at the second, only means however to know the distance in the direction east-west of the considered places, expressed in equinoctial hours[40](#40__Ibid___I__IV__p__315_316).

There would thus be a time difference of three equinoctial hours between Arbels (today Erbil in Iraqi Kurdistan) and Carthage, which would mean 3 ' 15 = 45 degrees of difference in longitude since a time zone corresponds to 360/24 = 15 degrees. The two cities are indeed on the same parallel, but in reality distant of 34 degrees of longitude, which shows the limits of these statements or their transmission, as Germaine Aujac notes[41](#41__Ibid___note_20__p__316).

Ptolemyalso used the records of Marin of Tyre, a Phoenician astronomer and geographerHe considered Marin to be the "last among moderns" to have critically examined the sources of information, as shown by "so many successive editions of hisRevision of the Map of Geography".[42](#42__Ibid___I__VI__p__317).But Marin had taken into account, in spite of everything, fanciful travel accounts that led him to evaluate the east-west length of the inhabited world at 225 degrees of longitude, whereas Ptolemydefended the value of 180 degrees

The seven centuries that we have just covered in great strides have built a conception of the inhabited world that is widely shared: a large island, often represented in the shape of a chlamydia, which occupies a more or less large portion of the northern hemisphere, surrounded by the ocean. The globe is cut by imaginary circles, the parallels and meridians, whose reference or origin varies according to the authors. They allow us to find our bearings on this sphere by observing astronomical phenomena, all interpreted within the framework of this model. Philosophically, Aristotlewas integrated into the Greek scholars' conceptions of the World, but it was Platocirculated the most from the first centuries of our era and until the middle of the Latin Middle Ages Aristotle's various treatises on natural philosophy were, however, transmitted to the Arabian Middle Ages, during which they were translated and commented upon, which in turn produced an abundant new philosophical and scientific literature. The wholetheAristotelian and Arabiccorpus, as well as Ptolemy, only became directly accessible to the Latin world after the Arab-Latin translation movement of the12th and 13th centuries. We must now examine more precisely what knowledge circulated between Late Antiquity and the first centuries of the Middle Ages.

Notes

[1](#1_1). Plato,Timaeus, 33a.

[2](#2_1). Ibid, 40b.

[3](#3_1). Plato,Phædo, 108e-109a, p. 295.

[4](#4_1). Aristotle,Treatise on Heaven, 295b10.

[5](#5_1). See all that concerns the study of the shape of the Earth and its size, Aristotle,Treatise on Heaven, 297a210-298a20.

[6](#6_1). Aristotle,Treatise on Heaven, 297a9-13.

[7](#7). Ibid, 297b25-30.

[8](#8). Ibid, 297b30-298a1.

[9](#9). Ibid, 298a15-20.

[10](#10). Ibid, 298a5-10.

[11](#11). Plato,Phaedo, 109b.

[12](#12). Aristotle,On Generation and Corruption, 334b34.

[13](#13). Ibid, 335a1.

[14](#14). Duhem, 1913, t. IX, chap. 16.

[15](#15). Aristotle,Physics, 194a.

[16](#16). See Roller, 2010.

[17](#17). Cleomedes,Elementary Theory, I, 10.

[18](#18). See D. R. Dicksto Hipparchusof Nicea,The Geographical Fragments of Hipparchus, 1960, pp. 1-46.

[19](#19). Strabo,Geography, II, 4.

[20](#20). See the very comprehensive study by Roller, 2006

[21](#21). Martin, 1878, p. 311

[22](#22). Aristotle,Treatise on Heaven, 294a22.

[23](#23). Ibid, 294a28.

[24](#24). Ibid, 294b15.

[25](#25). Martin, 1878, p. 245

[26](#26). Homer,Iliad, song XVIII, 478-617.

[27](#27). The dating of Cleomedes' workremains a source of interrogationknown that it is later than Posidonius(1st century B.C.) whom he quotes.

[28](#28). Cleomedes,Elementary Theory, chap. 1, 8.

[29](#29). Ibid.

[30](#30). Keyser, 2001, pp. 354 and 361.The sources used by Keyserare texts by Pliny, Theonof Smyrna, Straboand MartianusCapella

[31](#31). Strabo,Geography, t. I, 2, 3, p. 88-90.

[32](#32). Ibid, 4, 1, p. 167.

[33](#33). Ibid, 6, p. 171.

[34](#34). Ibid, 3, p. 168.

[35](#35). Zimmermann, 2002.

[36](#36). Map of Eratosthenesreconstructed in thenineteenth century by Edward Bunbury (1811-1895) and published in Bunbury, Edward H., A History of Ancient Geography among the Greeks and Romans from the Earliest Ages till the Fall of the Roman Empire, London, John Murray, 1883, p. 667 (Source Wikicommons).

[37](#37). Detienne, preface toLa Description de la terre habitée, p. 14.

[38](#38). Denysof Alexandria,ibid. , p. 81.

[39](#39). Aujac, 1993,Ptolemy, Geography I, II, and note by G. Aujacp. 308-309.

[40](#40). Ibid, I, IV, pp. 315-316.

[41](#41). Ibid. note 20, p. 316.

[42](#42). Ibid, I, VI, p. 317.

CHAPTER II

The circulation of knowledge... around the Mediterranean

If the idea that Antiquity admitted the sphericity of the Earth is fairly common today, the history of the transmission of this knowledge in Late Antiquity (3rd-6th century) and in the Middle Ages (7th-15th centuries) is subject to notable distortions. These distortions were produced mainly during the Enlightenment, for political reasons that are easy to understand, and they still permeate people's minds today: from the first centuries of the Middle Ages onwards, humanity would have lost its ancient knowledge and would have resurrected it only during the Renaissance, hence the name of the two periods. Collective amnesia, impoverishment of minds, cultural decline or the effect of Christian fanaticism..., the causes invoked are rarely documented and most often come from ideologicala priori. We have chosen here to try to track down real knowledge, such as it circulated around the Mediterranean from the first centuries of our era, by examining the manuals, the writings that were used as schools, the productions of the intellectual centers..., and by gathering clues that make it possible to evaluate their impact. To those whopersist in the idea that the Earth was thought to be flat, we ask that the historiographic data be rigorously examined to identify this "we" and to evaluate what it means, intellectually, over a period longer than a millennium

# I. TEACHING MANUALS

The term "textbook" used here refers to a certain number of works written by scholars and pedagogues who did not contribute new knowledge or little, but compiled the knowledge of their time, often with a view to disseminating it to students. Some of these works have had immense success, and we will follow their destiny in the geographical area of the Mediterranean basin, a place of exchange par excellence.

## Theon of Smyrna (2nd century)

Theonof Smyrna is the author of a work entitledLes Savoirs mathématiques sont nécessaires, translated and commented by Joëlle Delattre-Biencourtin the bookLire Platon. Le recours au savoir scientifique : arithmétique, musique, astronomie. The work of the man who probably taught in Smyrna (now Izmir) comments on Plato's scientific texts (extracts from The Republic, the Epinomis and the Timaeus), five or six centuries after their production.But he also comments, adds J. Delattre-Biencourt, on quotations from lesser-known authors such as Thrasyllusand Adrastus, "an Aristotelian scholar who lived around 100 A.D. and whosethesesTheonhelped to make known"Theonalso quotes Eratosthenes, Hipparchus, Dercyllidesand Aristotle. This leads J. Dellatre-Biencourt to conclude that this work is indeed "a manual of philosophy and mathematics, and it has come down to us because it was copied from Greek manuscripts at the end of the Middle Ages[1](#1__Delattre_Biencourt__introduct)". Theonwas well aware of the debates that had gone on in the preceding centuries.His approach consisted in giving an overview of the mathematical and astronomical knowledge essential to the cultivated man of thesecond century (it is in this sense that he interests us): like Cleomedes, he participated in the development of a literature of popularization. He was also a mathematician, of Pythagorean inspiration, and he proposed a theory of the combinations of the complex circular movements.

The chapter of Theon's workdevoted to astronomy and which comments on the writings of Adrastus(indicated in quotation marks) begins thus:

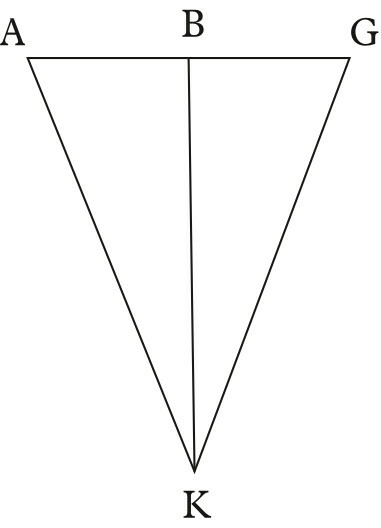
"The World in its totality is spherical, the Earth is its middle, has the shape of a sphere and has itself with the whole a relation of center by its position, and of point by its size": this is what it is necessary to begin by establishing before all the rest. [...] The World is spherical, indeed, and the Earth is spherical, "which has itself, with the whole, a relation of center by its position, and of point by its size": this is evident from the fact that "all the rises of the celestial bodies, their sunsets, their evolutions and again their rises are made at the same places for the people who live in the same region".[2](#2__Theon__Lire_Platon__p__239).

Other observations, more or less supported, are mentioned as proofs of this sphericity: thevariable duration of the rising or setting of the stars according to the longitude, the different duration of a lunar eclipse according to the place of observation, the visibility of the constellations according to the latitude Physical arguments are also invoked: the heavy bodies are "by nature in the middle of the whole" and "the parts of the earth [...] are also far from the middle". The figure of the Earth is thus a sphere and so is the sea that covers it in large part:

During a navigation, while from the boat one does not yet see the land or a vessel that is advancing, some who have climbed to the top of the mast have seen them, because they are on high ground, and, so to speak, they dominate the convexity of the sea that obstructs the view[3](#3__Ibid___p__242).

Theoncontinues with the demonstration of the necessary sphericity of any body of water at rest. It is inspired by a reasoning already found in Aristotle[4](#4__Voir_Aristote__Du_ciel__II__I) :

In fact, by nature, it is always from high points that the water flows towards the hollows; now what is high are the points farthest from the center of the Earth, and what is hollow are the least distant; so that, if we suppose that the surface of the water is straight and plane, for example the line ABG, if then from the center of the Earth, for example from the point K, we lead vertically towards the middle the line KB, and if we join the ends of the surface by the lines KA, KG, it is obvious that both lines KA, KG are larger than the line KB, and that both points A and G, which are farther frompoint K than point B is, will also be higher than point B The water will flow from points A and G to the deeper point B, simply until B, filling up, is equal to the distance from point K to each of points A and G; and in the same way, all the points that are on the surface of the water have an equal distance from point K. It is obvious that the water is spherical[5](#5__Ibid___p__243).



Finally, Theondiscusses at length the question of the mountains, whose altitude could call into question the regularity of the terrestrial sphere.He compares this altitude to the circumference of the globe, which is very close to 25 myriads and 2000 stadia as Eratosthenesshowed.Even if we take Archimedes(8 myriads and 182 stadia), the height difference of the highest mountains is only about ten stadia. Thus, "the height of the largest mountain is close to the eight thousandth part of the total diameter of the Earth[6](#6__Theon__Lire_Platon__p__244_24)"and therefore of negligible size compared to it, we would say today. Not only is there no doubt about the shape of our globe, but the orders of magnitude of this size and of its details are known.

Theonnot circulated as such in the Latin worldHowever, the theses it contains were translated from Greek into Latin and copiedalmost in their entirety by Chalcidiusa fourth-centuryChristian Platonic philosopherThe latter integrated - without mentioning this borrowing - most of Theoninto hisCommentary on the Timaeus.many centuries, the Middle Ages had only this one commentary as a means of access to Plato; it contained a translation of a part of theTimaeus, to which were associated astronomical developments that seemed to be those of Chalcidius himself, whereas they came from the treatise of Theonof Smyrna[7](#7__Delattre_Biencourt__2010).

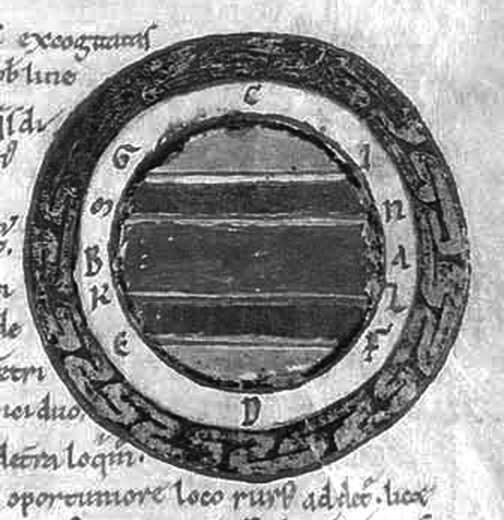
## Macrobius (4th century)

Another philosopher transmitted to the Latin world many extracts of the Timaeus.Macrobiusborn around 370 in Sicca in Numidia (North Africa His work, written in Latin and of Neoplatonic inspiration, was read throughout the Middle Ages (two hundred manuscripts are known to have been preserved). TheCommentary on the Dream of Scipio is a gloss on a passage from Book VI of the De re publica in which Cicerorecounts the "dream of Scipio". TheCommentary is the occasion to expose, in book I, the mechanics of the cosmos as Macrobius understood it, by reporting more or less faithfully the theses of the scholars of Antiquity. The work exposes, in the tone of a manual, a certain number of astronomical definitions. The definition of the meridian leaves no room for doubt:

The meridian is in fact the circle determined by the Sun when it has reached the plumb line of men's heads and marks exactly half the day. And assphericity of the Earth prevents that the dwelling places of all men are on the same plane, it is not the same region of the sky which is in the plumb of all; also there could not be a unique meridian for all: each people determines above the head its own meridian[8](#8__Macrobe__Commentaire__I__chap).

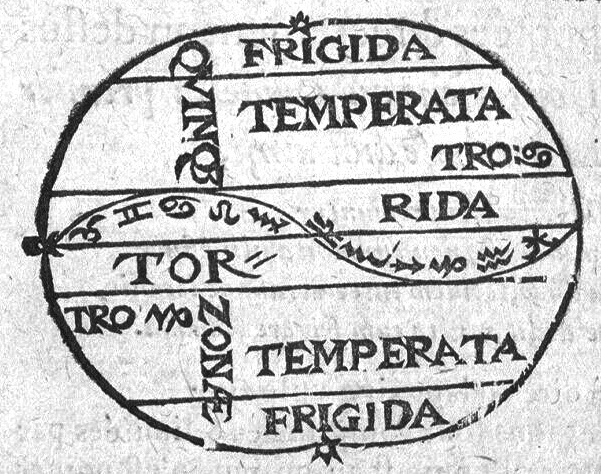
The sphericity of the Earth is confirmed by observations such as those of lunar eclipses. Macrobiusknows the "absolutely sure and unmistakable" measurements of the Earth's circumference which evaluate it at 250 000 stadia[9](#9__Ibid___I__chap__XX__SS_20). To deduce the diameter of the Earth, he instructs his reader to use the method explained earlier, which allows one to calculate a diameter by dividing the circumference by "three with the addition of a seventh, a rule that I mentioned earlier in connection with the diameter and circumference[10](#10__Ibid___I__chap__XX__SS_21)". This very scholastic approach characterizes Book I, which has many illustrations in the surviving medieval manuscripts.

Some represent the globe divided into five zones, according to an ancient conception that goes back, according to the sources, to Parmenidesin the5th century BC or to Cratèsof Milos in the2nd century BC.[11](#11__A_propos_de_ces_theories_voi) The globe is divided into two zones called frozen at the two poles, and two temperate zones separated by a zone called torrid in the center. Duhemquotes passages from this theory of the five zones, exposed in book II of theCommentary.Between the two polar caps and the torrid zone are two regions "tempered bythe two extreme climates to which each of them is confined"There are, in short, four habitable "spots", that is to say three other zones that have the same climate as our part inhabited by the "Romans, Greeks and Barbarians of all nations", since for Macrobius, the ocean that surrounds the Earth passing through the poles divides each of the habitable zones in two There is thus not "only one human kind distinct from ours; there are several kinds separated from each other".[12](#12__Macrobe__Commentaire__II__ch).



The five climatic zones according to Macrobius[13](#13__Macrobe__Commentaire_du_Song)

This model - different from that of Ptolemy, who considered only one "island" on the sphere - is a logical consequence of Greek astronomy and geography, since it is based on the symmetry of the globe and the equivalence in terms of climate - a term that means, in Greek, the inclination of the Sun's raysIn the first printed works fromthefifteenth century, we find another representation of the five climate zones[14](#14__La_Sphere_de_Jean_de_Sacrobo).



Macrobiuswas often studiedChalcidius'Commentary on the Timaeus in the monasteries. Gerbertof Aurillac, for example, the learned Pope Sylvester II of thetenth century, mentions both in his works. Many current scholarly studies have documented the reception of these two titles in medieval schools (see bibliography).

## Martianus Capella (5th century)

The Marriage of Philology and Mercury is an important work in the history of the circulation of knowledge around the Mediterranean of the late antique world.Written in Latin by a Carthaginian, MartianusCapella, this nine-book allegorical encyclopedia servedas a reference manual for an exceptional length of time: almost a millennium

We do not have access to the text of book VIII in which the author makes an allegorical character named Astronomy speak. Only books I, IV, VI, VII, IX have been edited and translated (by Belles Lettres). André Lebœuffle who read for us this manuscript, summarizes it as follows:

Thus MartianusCapella teaches us (§ 814-816) that the sublunary world, made up of the four elements, is spherical; in its center the globe of the Earth is immobile In the ether circulate the stars, that is to say the seven planets and the sphere of stars, itself enveloped by a ninth sphere, anastre, which ensures the cohesion of the universe[15](#15__Le_Boeuffle__1988__p__178).

MartianusCapella then exposed several conceptions of the cosmos inherited from antiquity: the geocentric world of Ptolemycourse, but also the mixed system imagined by Heraclidesof Pontus (4th century BC), in which the Sun has an annual motion around the Earth, while Mercury and Venus have a different motion.These two planets, writes Martianus, "revolve around the Sun, while the Sun and the other planets would revolve around the Earth[16](#16__Ibid___p__180)".

The repercussion of the work can be measured by this remark of Copernicus, eleven centuries later, in hisDe revolutionibus orbium cœlestium (1543), about the orbits of Venus and Mercury:

This is why, in my opinion, one should not despise what MartianusCapella, author of an encyclopedia, and some other Latin [authors] have known very well. They consider, indeed, that Venus and Mercury turn around the Sun which is their center[17](#17__Copernic__De_revolutionibus).

This work thus transmits on a long duration the cosmographic theses of the Greek world, to which Martianusadds, like Macrobius, that of the four possible inhabited zones, that is to say two temperate zones on both sides of the torrid zone: one knows the winter while the other knows the summer And on the other side of the Earth, the one that knows the day when we know the night, there are still two.

The posterity of this text, of which two hundred and twenty-four manuscripts have come down to us, is telling. As early as 534, a recension with corrections was made in Rome by Securus Melior Felix[18](#18__Antes__1983__p_289). The work is quoted by authors of late antiquity like Fulgence in his Expositio sermonum antiquorum; it is also quoted by Gregory of Tours(bishop of theVIth century) who had perhaps a version expurgated of the first two books, filled of pagan mythology[19](#19__Ibid___p__292). Cassiodorus, founder of the monastery of Vivarium in Calabria, wrote between 560 and 580 hisInstitutions of the divine and secular letters to guide the reading of the monks. He cites The Wedding and states that the original title of Martianuswas "the seven teachings". The title of the work is indeed based on a metaphor exposed at the end of the second book: Mercury offers sevenwedding gifts to Philology: grammar, dialectic, rhetoric (which form thetrivium), geometry, arithmetic, astronomy, harmony (which form the quadrivium). The work thus popularized the organization of knowledge into seven liberal arts, which dates back to Porphyry. It was in the middle of the ninth century that the text of Martianuswidely disseminated in Carolingian intellectual circles, notably under the influence of commentators such as John Scotus Erigena. It was a common object of study among the scholastics.

From Smyrna to Carthage via Africa, we see the teaching of astronomy developed in the Greek world being transmitted in various forms. These first centuries of our era are also those during which other institutions of knowledge develop, along with Christianity. The three works we have just mentioned - Theon's bookassociated withPlatoTimaeus in theCommentary of Chalcidius,Macrobius'Commentary on Scipio's Dream andMartianusCapella'sThe Noces - became references for monastery and cathedral schools. Works such asthe Natural History of Plinythe Elder also contributed to this transmission. Written in Latin in the first century AD, it presents a popularized - and approximate - version of this knowledge. The work states, about the figure of the Earth: "the unanimous consent decides; we say the globe of the Earth[20](#20__Pline__Histoire_naturelle__1)".

Religious schools subsequently disseminated the representation of a World centered on an immobile and spherical Earth, which, from an astronomicalnot raise any fundamental questions except on one point: the possibility evoked by Macrobiusand MartianusCapella that there were not one, but four inhabited islands on EarthFrom the time of Pliny, this idea seems to raise resistance or at least, as he says himself, "a great debate between science and the vulgar": "Science claims that men are spread on the circumference of the Earth, that they have their feet opposite each other, that everywhere the sky is also on their heads[21](#21__Ibid___chap__65__p__130)". This idea, which was difficult for the common man to accept, took on a new dimension in the first Christian writings. It raises the question of Revelation, from which three peoples on Earth would have escaped.

# II. THE CHRISTIAN CHURCHES AND THE SPHERICITY OF THE EARTH

With the Fathers of the Church, we approach the hinge, indeed the Gordian knot of the controversy mentioned at the beginning of our work. The Fathers wrote most of the early Christian literature in the first centuries of our era, which guided biblical exegesis, including the cosmological verses of interest to our study.

## The Lactance case

The idea that Christianity had forgotten sphericity is often supported by its defenderson a quotation from Lactantius, a rhetorician of the3rd-4th century († 325). This text violently contests the existence of the antipodes and thus the sphericity of the Earth. It is extracted from his Divine Institutions and was often quoted, from the end of the 18th century, as emblematic of the thought spread by the Church.In book III entitled "On the false wisdom of the philosophers", Lactantius takes the defense of those who "respect the mysteries" against those who undertook to "penetrate by the light of their mind the secrets of nature", the philosophers in general and Platoin particular He writes, around 305 AD:

Do those who hold that there are antipodes hold a reasonable sentiment? Is there anyone so extravagant as to believe that there are men who have their feet up and their heads down; that everything that lies down in this country is suspended in that one; that grasses and trees grow down there, and that rain and hail fall up there? Is it any wonder that the hanging gardens of Babylon are included among the wonders of nature, since the philosophers also hang seas, cities and mountains?[22](#22__Lactance__Institutions_divin) ?

His hostility to the idea of antipodes is unquestionable. He may be reacting here to the writings of Lucretius(† 55 B.C.) who, in hisDe natura rerum wrote "below us, the animals walk with their heads down[23](#23__Lucrece__De_natura_rerum__li)". But Lactantiusis neither a philosopher nor a scholar, and he has no legitimacy to teach cosmologyhisstand against the antipodes - whose argument is quite inept even for the time - remained isolated within the Roman ChurchLactantius converted to Christianity under the reign of Diocletian; he owes his posterity to the theological sum that is theInstitutions, written in Latin at the court of Constantine.He was considered a religious authority by Augustineand Jerome, but not a scientific authority, and a decretal of Pope Gelasiusdating from thesixth century considered that the writings of Lactantius were apocryphal and did not have to be received by the Church. The title of Father of the Church was not given to him until very late, in 1770. During the Renaissance, his work was one of the most frequently printed and the elegance of his prose earned him the nickname of "ChristianCicero" by Pico della Mirandola, but this did not give him any morescientific legitimacy in the eyes of readersthan Homerwe shall see, it was the authors of theeighteenth and nineteenth centuries who, following Voltaire, erected the prose of Lactantius as an emblem of patristic literature. They associated with it by amalgam the writings of the other Fathers of the Church, supposed to preach the flat form of the Earth. Let's take a closer look at this.

## The proponents of sphericity

One of the first Fathers, and the one who is considered the initiator of biblical exegesis, is the Greek Origen(† 253) He had left his birthplace, Alexandria, to found a school (and a library) in Caesarea, Palestine, where he taught philosophy, astronomy and theology. He most likely benefited from the excellence of theAlexandrianteachingsin astronomyIn hisDe principiis, he comments on Clement of Rome (pope between 89 and 97) and his assertion of the existence of "antichtonians" (or antipodians) living on the other side of the Earth, but who could never be reached because the Ocean was deemed impassable[24](#24__Origene__De_principiis_II__3). Origen makes this possibility of the antipodians his own and thus admits sphericity without the least restriction. Although only a few fragments of his commentary on Genesis have survived, it is known that the author showed himself to be "exactly informed of the doctrines developed by the astronomers of his time[25](#25__Duhem__1913__II__2__p__394)".

In the following century, two Fathers from Cappadocia are particularly famous: Basilof Caesarea († 379) and Gregory, bishop of Nyssa(†c. 395). In his Hexameron (the commentary on the six days of Creation), Basilintegrates Aristotelian physics with the commentary on Genesis in order to explain why the Earth is immobile and is at the center of the world. A reading of hisHomilies on Genesis shows that he has a precise knowledge of the Aristotelian treatise On Heaven. If he does not explicitly say that the Earth is spherical, he does not say in any way that it is flat (which the Bible does not say), the concept of a flat Earth simply does not exist in the scientific sources he uses. On the other hand, the Aristotelian theory of the gradations and the idea of equidistance in relation to the circular periphery (the sky is a "vault", without any possible discussion[26](#26__Basile_de_Cesaree__Premiere)), two data which imply the terrestrial sphericity. AsAugustineafter him, the knowledge of the philosophers is at the same time clearly exposed and considered as not necessary; if there is condemnation, it relates to the excess of curiosity shown by the scientists, not to the contents of the theories:

This median position is not due to chance or to its own movement, but to its natural and necessary position. For, since the celestial body occupies the upper end of space, the masses which, according to these statements, we assume to fall from above, will converge on all sides at the center. And the point where the parts will be carried, will obviously be the one where the whole will gather. If, therefore, stones, pieces of wood, and all earthly bodies are carried downwards, this would also be the proper and appropriate position of the whole earth; if, on the contrary, a light body is carried away from the center, it is clear that its motion will carry it to the highest places. Thus the proper tendency of the heaviest bodies is towards the bottom, and the bottom, the reason shows, is the center of space[27](#27__Ibid___p__129).

As for his brother Gregory, we know from John Scotus Erigena(†c. 870) that he defended the same cosmography as Plato[28](#28__Duhem__1913__III__p__56).

Contrary to what may have been said, the Fathers had a good knowledge of pagan theories; Sylvain Giet, a modern translator of Basil, thinks moreover that "if Basilused manuals, he had no less direct knowledge of the original works which are summarized in them[29](#29__Giet__dans_Basile__Homelies)". BasilHexameron, which was subsequently widely readand translated into the vulgar language during the Renaissance, thus already illustrated the compatibility of pagan Greek astronomy and physics with Christian cosmology. Significantly, for a medievalist like Bernard Ribémont, who examines them "from" the medieval period and in the light of their posterity, "the commentaries on the work of the six days, [...] in particular those of Basiland Ambrose, possess a dimension oflibri de natura rerum, which makes them quite close to the encyclopedia[30](#30__Ribemond__2001__p__227)".

other side of the Mediterranean, the same approach can be observed in Ambrose(† 397), bishop of MilanIn his ownHexameron, he contests- using the theory of the four elements - that the Earth can stand on water because it is heavier. He implies here that we cannot be satisfied with a literalist approach to the verse: "It is He Himself who founded it on the seas, and who laid it on the rivers[31](#31__Job_23__2)". Ambroseproposes to stick to what Job said in another verse: "He suspended the earth on nothing[32](#32__Job_26__7)". On the other hand, the earth is at the center of the universe, but when the Scriptures say "I have established its pillars[33](#33__Ps_74__4)But when the Scriptures say, "I have strengthened the pillars of the earth," the bishop writes, "we must not imagine that the earth was really supported on pillars, but on that power which supports and sustains the substance of the earth.[34](#34__Ambroise_de_Milan__Hexameron)". Ambrosethus proposes an exegesis which does not take the metaphors of the Bible[35](#35__Voir_d_autres_exemples_dans).

In Africa, Augustine, bishop of Hippo († 430), played a great role in the organization of a Christian teaching integrating the seven liberal arts, which was then disseminated in cathedral schools fromsixth century onwardsIn The City of God, he wrote about the antipodes in a passage often quoted in charge:

As for the legends concerning the antipodes, i.e. men walking on the opposite side of the Earth, where the sun rises when it sets for us, and placing their feet opposite ours, there is no reason to believe them. This statement has no historical basis, it is a reasoning based on a conjecture[36](#36__Augustin__Cite_de_Dieu__livr).

This denial of the existence of human beings inhabiting the antipodes has nothing to do with a cosmographic position. Augustineessentially denies that the area can be inhabited, not that it exists:

The Earth, it is said, is suspended inside the celestial vault and the world has the same place for the center and the bottom; hence the conclusion that the part of the Earth below us is certainly inhabited by men. But, supposing that the world had a spherical and round form, even if this could be demonstrated in some way, it would not follow that in this part the earth would arise dry from the mass of water; and even if it were dry, it would not be necessary that it should be inhabited[37](#37__Ibid___livre_XVI__chap__9__p).

The Earth is undoubtedly spherical, and there may be land on the other side of the globe, but the bishop of Hippo does not accept the idea thathuman beings could have escaped Revelation Or else it would be necessary to imagine that "some men could have sailed from this part of the world to the other through the immensity of the ocean. Even then, "the human race in this region would have originated with the first man. Augustinethereforenever refuted the idea of sphericity, and he writes elsewhere of divine virtue as "the cause of the roundness of the earth and the sun.[38](#38__Ibid___livre_XII__chap__25). Here he deals with Christian theology and the fact that Christ came to save all the descendants of Adam. Let us note that this point had not posed any problem to Origenfor whom the antipodians are "governed by the same dispositions of the sovereign God[39](#39__Origene__De_Principiis__II)".

Finally, when we examine the scientific choices made by the Fathers, we must take into account their entire approach. Augustine, especially inOn Christian Doctrine, are clear: faith must not be built on the ruins of reason or science, but neither must the latter be left to themselves. As Paul Agaësseand Aimé Solignac, translators ofGenesis in the literal sense, remind us: "Augustineis indeed concerned not to compromise the access of non-believing scholars to the Christian faith by presenting to them as data of faith interpretations contrary to science[40](#40__Agaesse_et_Solignac__dans_Au)". Thus, the object of astronomical research is sometimes carefully described, even if it is to show its vanity, not that the conclusions of the scientists are false (Augustinesometimes lets his admiration for the results obtained show), but that they are not always necessary for the ChristianIt is the "vanity" of scientific curiosity that can be challenged by the Christian, while the detail of knowledge still leaves thelearnedAugustinedreaming:

Their curious and vain science [makes them] able to count the stars and the grains of sand, to measure the vast regions of the sky and to discover the routes of the planets and the stars [...]; they predict several years before the eclipses of the Sun and the Moon; they mark the day, the hour and the size of it, and the effects follow their predictions: they even wrote rules of it which are still read today [...] and what was predicted always happens[41](#41__Augustin__Confessions__V__II).

## The Church of Antioch

Lactantiusis the only one among the Church Fathers of the Latin West to have contested sphericityOther Churchmen, in the East, however, defended, in the name of the Scriptures and contrary to Origen, Basilor Ambrose, a position hostile to that of the astronomers

John Chrysostom(† 407), bishop of Antioch and then archbishop of Constantinople, is the author of an immense liturgical literatureAmong the hundreds of homilies, sermons and speeches preserved, history has retained, thanks to Voltaire, the fourteenth homily on the letter of St. Paul to the HebrewsThe theme is the place of Jesus Christ at "the right hand of the throne of our sovereign Majesty"exactly a question of astronomy Nevertheless, John cries out in this text: "Where are they now who affirm the movement of heaven? Where are those who say that its shape is spherical?" He clearly questions the existence of concentric circles carrying the stars and revolving around a spherical Earth and wants to substitute a "tabernacle" representation whose minister is Jesus Christ. This is a literalist reading of the book of Exodus (40, 1-20) and of the epistle to the Hebrews in which the Jewish tabernacle is described, a building whose lower part symbolically represents the Earth and which we will detail later.

Other figures of this Antiochian Church supported such a reading: Diodorusof Tarsus the founder († 390), Theodore of Mopsuestis(† 428) his pupil, as well as John Chrysostom, Severian of Gabala(† 408), Theodoretof Cyr († 457) and Procopiusof Gaza († 528)The latter, for example, affirms in his commentary on Genesis that "there is no inhabited counter-earth" for a reason similar to that put forward by Augustine: "Christ would have been present there too"[42](#42__Procope_de_Gaza__Commentarii). He also defends a representation of the Earth supported by the waters, taking up to the letter excerpts from the psalms such as this passage which evokes "He who established the earth on the water[43](#43__Ps_135__6)". Finally, the refutation of sphericity is often mentioned in the work Answers to the Orthodox falsely attributed to Justin the Martyr, but it is another Justin, also a member of the Church of Antioch.Only John Chrysostomwas admitted by Rome as a Father of the Church

The theses defended by this Church, unlike those of the two Greek Fathers, are indeed in favor of a non-spherical Earth, but they were practically not disseminated in the West, on the one hand because they were written in Greek, and on the other hand precisely because the theological positions of their authors were condemned for their Nestorian inspiration by the Councils of Ephesus (431) and Constantinople (553). We find a quite isolated revival in the Middle Ages, in Theophylact, archbishop of Bulgaria (1088/89-1126), whose commentary on the epistle to the Hebrews, of Antiochian inspiration, takes up that of John Chrysostomagainst sphericity and affirms that the Earth is "in the form of a curtain[44](#44__Scheuchzer__1735__p__53___Ma)". These Antiochian theses owe some of their current fame to the Christian philosopher John Philopon(† 580), who taught at the school of Alexandria in thesixth century and fought against them in a work that undertook to reconcile the Christian religion and classical philosophy (The Creation of the World, see below)But the work of John Philoponwas not transmitted to the Latin Middle Ages either, because of an anathema pronounced against him in 680 by the Christian authorities for monophysism[45](#45__Brown__2011).

Another work that is often put forward as proof of Christian doctrines that go against sphericity is that of CosmasIndicopleustes, a Christian - also Nestorian[46](#46__Ibid) - of whom it is not even sure that he was a monk at the end of his life (he was first a merchant). He was inspired by the theses of Theodore of Mopsuestia.Let us note immediately, before going any further, that the first Latin translation of Cosmasdates from 1707 (seebelow). The title of the work is Christian Topography: it consists of a violent diatribe against the pagan systems and those of the "Christians of appearance" who defend the cosmographic theses of the Greek scholars:

There are Christians of appearance who, without taking into account the divine Scripture, which they disdain and despise in the manner of the philosophers of the outside world, suppose that the shape of Heaven is spherical, misled by the eclipses of the Sun and the Moon[47](#47__Cosmas__Topologie__1968__vol).

The argument of the eclipses is rejected, without further analysis, because it is used to demonstrate the sphericity of the Earth, associated with that of the Sky. The only representation of the World that can be reconciled with the Scriptures is, for Cosmasthe one that Moses reported when he came down from Sinai, after having seen the Ark of the Covenant The tabernacle he describes is really, according to him, a "copy of the Universe" composed of two floors: a lower space where we live and an upper space which is Paradise. It is separated in two by a veil (the sky). The tabernacle is rectangular in shape: the southern and northern sides, on which the sky is rounded in the form of a vault, are longer than the eastern and western sides. The author obviously rejects the organization of the world into concentric spheres as well as the associated hierarchy of elements. There is no question either of admitting, like the philosophers, the existence of antipodes that he assimilates to old wives' tales:

If one were to examine the question of antipodes more thoroughly, one would easily uncover the old wives' tales told by these people. Let us suppose that the feet of one man are opposite the feet of another man and that these feet support them both on land, in water, in air, in fire, or in any other matter, how are these men both standing?[48](#48__Ibid___p__290) ?

The Earth according to Cosmasis thus flat like the bottom of the tabernacle and suspended in space by the power of God The Sun seems to set in the West but it does not go around the Earth. It passes behind a high mountain located in the North and it is thus that the night occurs.

However, contrary to what serious authors still affirm today, this work has nothing to do with the official doctrine of the Church, especially since Cosmaswas also condemned as a Nestorian and his text was not transmitted to the Western Middle Ages The reading of the Scriptures that characterizes the Church of Antioch - which is itself only a small part of the Church of the East - is far from being unanimous. John Philoponshows inThe Creation of the World how the literalist approach to the biblical text by Theodore of Mopsutewas opposed by his contemporary Basilof Caesarea. With the help of a very Aristotelian demonstration, he defends the idea that Moses already thought of the Earth as spherical, as did Isaiah (who compared it to a circle) and Job (who suspended it in a void)[49](#49__Philopon__Creation__II__4__p). He even claims that Ptolemyand Hipparchuswere inspired by Moses.He invites"those who have invented misplaced fables" to oppose the sphericity of the sky and the world to reread Basilof Caesarea, Gregoryof Nyssa, Gregory of Nazianzus, Athanasius(all four Fathers of the Church) and "numerousChurch didascales" - so many Christian authorities who have defended the opposite[50](#50__Ibid___III__13__p__154).

The Church of the East, as we have said, is not limited to the Nestorian current.Two bishops, astronomers and geographers, contributed to the transmission and enrichment of Greek knowledge: Severus Sebokht(† 667), bishop of Qinnasrin in Syria, and James of Edessa(† 708), bishop of the eponymous city in the south-east of modern Turkey Both wrote in Syriac. They transmitted whole sectionsPtolemyGeography and, of course, the thesis of the sphericity of the Earth. Olivier Defaux, who has studied these texts, notes that Severus uses many data from theEasy Tables and the Almagest in his Treatise on the Constellations, where he cites the measurement of the earth's circumference by Eratosthenes, while James of Edessamentions in hisHexameron the dimensions of Ptolemy, and the names and coordinates of many places identical to those described by the Greek geographer[51](#51__Defaux__2014).

# III. FROM LATE ANTIQUITY TO THE MIDDLE AGES: DEVELOPMENTS IN ARABIC SCIENCE

From the eighth century onwards, a new intellectual boom began in the eastern part of the Mediterranean. The geographical,astronomical and cosmographicaldevelopmentsin the medieval Arab world are of interest to our study for several reasons: they provide information on the Greek and Syriac heritage of Arab scholars and on the new theses developed in this civilization between the8th and 14th centuries. Finally, they inform us to a large extent about the knowledge that would later be transmitted to the Latin world thanks to the Arab-Latin translations of the 12th and 13th centuries.

The first two centuries of the Abbasid era, from the founding of Baghdad in 750 to the end of the tenth century, were marked by a major translation movement.This phenomenon began during the reign of al-Manṣūr(754-775), but the name of the caliph al-Ma'mūn(813-833) remains attached to itThe famous House of Wisdom is often presented as the symbol of this period, even though its function as a "national library" centralizing manuscripts largely precedes the reign of al-Ma'mūn, as Dimitri Gutas, a specialist in thisnotesA translation activity existed before the Muslim era-from Greek to Syriac-impelled in particular by Sergiusof Reshaynā in the earlysixth century. It is certain that a translation movement of great magnitude appeared in the ninth century and lasted until the eleventh, from Greek to Arabic or from Syriac to Arabic, a movement in which the whole elite of Abbasid society was involved (caliphs, princes, but also civil servants, military leaders, merchants, bankers, professors and scholars)[52](#52__Gutas__2005__p__95_105).

The works of classical science were abundantly translated, as the Arab civilization considered itself the repository of this heritage. Aristotle was translated by the Christian Isḥāqb.Ḥunayn († 910), and the only surviving manuscript of it contains extensive commentaries by late antique philosophers (Alexanderof Aphrodite, John Philopon) and early Arab commentatorsPlatowas less translated into Arabic and the manuscripts have not come down to us, but we know from Arabic biographers that theTimaeus was translated and Plato's views are frequently reported in later commentaries. The philosophers of nature in the different regions of the Empire took up, commented on and criticized the corpus of this so-called Arab-Muslim science, since it was written mainly in Arabic and in a world with a Muslim majority. For all that, its authors are of diverse religions and languages. Let us mention Al-Fārābīin the9th-10th century and Ibn Sīnā (Avicenna) in the10th-11th century, two Muslim scholars expressing themselves in both Arabic and Persian; the Baghdad physician Abū al-Barakātand the philosopher Maimonidesfrom Cordoba, living in Egypt, both of whom expressed themselves in Arabic and Hebrew; the Arab and Muslim philosopher Ibn Rushd (Averroes) living in Andalusia in the12th century. These philosophers unanimously adopted the concept of a spherical and immobile Earth, the center of the World, around which the spheres carrying the Moon, the Sun and the other planets revolve. They also adopted the hierarchy of elements that describes the vertical ordering of things.

The Treatise on Heaven by Avicenna († 1037), which is the second part of his famous Book of Healing, sets out the theses that were debated from antiquity until the 11th century.The physician-philosopher defends the Aristotelian arguments set outabove. Chapter 3 describes the different celestial bodies and their movements, then the Earth and the elements that compose it. He tries to explain why a part of the land "presents this relief which makes the ground uneven", in other words emerges. The explanation, as in Aristotle, is conceived in terms of dryness, because a humid earth "should keep its natural spherical shape" To demonstrate this, Avicenna also mentions the observation of sailors:

If the surface of the water were not spherical, the ships would be seen as a whole when viewed from a distance, while seeing them smaller, but you would not see one part first without seeing another. It doesn't happen like that. First you see the top of the rudder, then the boat appears[53](#53__Avicenne__Livre_de_la_gueris).

He also proposes another demonstration, more geometrical, of the sphericity. It is similar to the one we read in the writings of Theonof Smyrna:

If water were a flat surface, its central part would be closer to the center [of the Earth] towards which it moves by nature, than the two extreme parts. These two extreme parts would have to incline towards this center in order to reach it, as we have said, or rather to be both in a similar relation, already mentioned, to this center. [...] Thus the interval between the surface and the center is a unique interval and [this surface] is spherical[54](#54__Ibid___p__20_21).

Avicenna is preoccupied with the search for the root cause of the immobility of the Earth, which cannot be constrained by the air or the stars that surround it. The place of the Earth is, by nature, the center of the World because it is the place where all serious bodies are immobilized[55](#55__Ibid___chap__6__p__56_57).

Avicennadoes not formulate any new cosmographic hypotheses here: it is his role as a ferryman that interests us, for theBook of Healing played a very important role in the Latin West. This second part was partially translated in the second half of the twelfth century in Toledo. A Treatise on Heaven and the World, of Aristotelian inspiration, but which was not Avicenna(it is a compilation of a commentary by Themistiuson Aristotle's text) was integrated into this translation. Theauthentic Treatise on Heaven was not translated until the second half of the thirteenth century[56](#56__A_propos_de_la_transmission). The work of the physician-philosopher - whose Neoplatonic accents appealed to Christians - was subsequently one of the most widely disseminated in European universities, sometimes even used to interpret and understand the texts of Aristotle that were becoming available in Latin at the same time.

Alongside natural philosophy, another science appeared after the translation of PtolemyGeography (jughrāfiyā).This discipline was, as in Alexandria in the2nd century, the business of mathematicians and astronomers. It developed from the ninth century under the name ṣūrat al-ʾarḍ (image of the Earth), which is the counterpart of the Latin term imago mundi.Motivated by administrative considerations, cartographydeveloped; in particular, it took up the Greek division of the oecumene into five climates that the Arabs attributed to Ptolemy.Then emerged the geography known asmasālik wa al-mamālik, which described "the routes and states" under the pen of scholars like Yaʿqūbīor Muqaddasī[57](#57__Tixier_du_Mesnil__2010__p__2). Finally when the intellectual center shifted to the West, a geography of the whole inhabited world emerged, the best known representative of which is undoubtedly the Sicilian al-Idrīsī(† 1165)religious purposes (determination of theQibla - the direction of Mecca - or precision in determining prayer times), many improvements in astronomical observations were made. Nautical science was also able to benefit from refinements in the construction of astrolabes, the invention of which is often attributed to the Arabs but dates back to the Greeks.

In the ninth century, during the reign of Sultan al-Maʾmūn, Arab scholars set out to measure the length of one degree of the earth's meridian with a method slightly different from that of Eratosthenes.It is a later Arab biographer, Ibn Khallikan, who describes the expedition that went to the Singar desert and the plain of Kufa, places chosen for their flatness:

They stopped at a place in this desert and measured the height of the North Pole with certain instruments. There they drove a stake to which they tied a long rope, after which they walked in the direction of the North on the flat ground, without deviating to the right or to the left, as far as they could. When they reached the end of the rope, they set up a second stake, tied another long rope to it andwalking northagainas before They did not stop this maneuver until they arrived at a place where they took the height of the pole already named and where they found that, compared to the first measurement, this height had increased by one degree. Then they measured the length of the ground determined by the length of the cord and they arrived at the sum of 66 miles 2/3[58](#58__Arnaldez__1962).

The method of measuring the length of the meridian portion corresponding to one degree of latitude seems less practical - as noted by E. S. Kennedy[59](#59__Kennedy__1997__p__219) - than that chosen by the Greeks (taking a known length along a meridian and then determining the difference in latitude between the two ends). The interpretation of this result in the following centuries depends on the value given to the Arabicmīl and we will see that the question will be crucial on the eve of Columbus.We find the same value of 66mīl and 2/3 mentioned in The Book of Warning and Revision, a compilation by the encyclopedist Masʿūdī († 956), who lived between Baghdad and Fustat. For Masʿūdī, this result is the same as Ptolemyand "multiplying this number by the 360 degrees that the circle has, we obtain 24,000mīl" for the circumference of the Earth, which, with the equivalence of 1 mīl to 1.9735 of our present-day kilometers, overestimates this circumference by almost one-fifth[60](#60__Macoudi__1966__p__43). Other accounts report a value of 56 mīl and 2/3 (much closer to reality) and this is the one adopted by most Arab scientists.

Arabic biographers report that al-Bīrūnī(d. 1048), a famous Persian mathematician who was a contemporary of Avicenna, also made a measurement of a portion of a meridian when he was only seventeen years old; he was then the student of Abū Naṣr, another mathematician whose work in spherical trigonometry profoundly transformed astronomical calculationsAl-Bīrūnīincludes in his works the value of 56mīl and 2/3 for the length of a degree of meridian. An astronomer who lived during the reign of al-Maʾmūn, al-Farghānī (Alfraganusin Latin, †c 860), reports the same result after a summary description of the method in his summary of the Almageste, the Book of Celestial Movements and Compendium on the Science of the Stars, which is a textbook on cosmography. One finds there the description of the various calendars, the justification of the sphericity of the heavens and the Earth, the two movements of the celestial sphere, the description of the inhabited part of the Earth, its climates, its circumference, the movement of the wandering stars in longitude and latitude, the model of the epicycles and the eccentrics, the movement of precession of the fixed stars, the distances of all the stars to the Earth and their sizes, the movements of the Moon and the Sun[61](#61__Morelon__1997__p__39_40).

In chapter 3, al-Farghānījustifies the shape of the Earth thus:

Thus the scholars have agreed that the Earth has also, by the whole of its parts of land and sea, the shape of a sphere and the proof of this is that the Sun, the Moon, and the other stars do not rise and set together for the inhabitants of the Earth at the same time. Rather, their rising is seen in theeasternpartsthe Earth before they are seen in the western parts, and likewise their setting in the eastern parts before they are seen in the western[62](#62__Al_Farghani__Compendium__cha).

The work of al-Farghānīis of interest to us because it circulated in the West long before that of Ptolemy's commentator astronomerRegiomontanus(† 1476) and more than that of any other Arab astronomer, because it was quite simple and easy to understandThe work was translated into Latin under the titleCompendium on the Science of the Stars by John of Sevilleand later by Gerardof Cremona in the12th century. We use here the bilingual Arabic/Latin edition made by Jacob Golius, professor of Arabic in Leiden, in the17th century.The estimate of the length of the meridian degree it contains will be very often mentioned on the eve of Columbus.

Arab science spread with the Empire to the whole Mediterranean. In his Book of the Entertainment of One Who Wishes to Cross the Lands, the geographer al-Idrīsīdescribes the commission given to him by the king of Sicily, Roger II, to know the limits of his states, the land and sea routes that cross them, the climates in which they are situated, the seas, canals and rivers that water them. This work - sometimes calledRoger's Book - was translated and published at the end of the 19th century in two volumes, Geography I and II, to which we refer in their digitized version by Gallica.In order to gather the necessary information, Roger had all the astronomical and geographical literature at hisdisposalconsultedand had educated travelers from all over the world searched for him, whom he questioned separately in order to cross-check their accounts This investigation lasted fifteen years and Roger then had a map drawn "with a compass" recording the latitudes and longitudes of the remarkable points, using the testimonies "of which the general confrontation had proved the perfect accuracy[63](#63__Idrisi__Geographie_I__p__XX)". Idrīsīthen explains how he was charged with collecting all of this dataIn order to present them, he had to "begin this talk with the figure of the Earth" whose description "is calledgeography by Ptolemy":

We say that what results from the words of the philosophers, the illustrious scientists and the skilled observers in the science of the celestial bodies is that the Earth is round like the circle of the sphere, that the water adheres to it, that it stagnates completely and naturally on it without separating from it[64](#64__Ibid___p__1).

He specifies that the "totality of the population of the globe inhabits the northern part" and that this globe has a circumference of which he reports two estimates, one at 11,000, the other at 12,000 farsakhs, which, taking into account the fact that this ancient Persian unit corresponding to nearly 6 of our kilometers (one hour's walk of a soldier) or 3 Arab mīl, greatly overestimates this circumference[65](#65__Ibid___p__2).

Natural philosophers, astronomers and Arab geographers thus transmitted to the medieval world a relatively homogeneous cosmography on thephilosophical level, accompanied by very important astronomical and geographical developments The spherical shape of the Earth is not in doubt, but the precise circumference of the Earth is still a matter of debate, although it remains between 40,000 km and 70,000 km. The Latins were eager to learn about this scientific knowledge, but there was no "clash of cultures" as there would have been if the Church, immersed in the "platitudinous" vision of the Nestorians for six centuries, had suddenly discovered its error by reading the Arabs and through them the Greeks. The controversies that arose in thethirteenth century concerned such essential metaphysical questions as the eternity of the world, divine providence and the uniqueness of the intellective soul, but nowhere is there the slightest trace of a controversy over the sphericity of the earth.

This last part of our chapter has led us to circulate around the Mediterranean and through the different civilizations that surrounded it between Antiquity and the High Middle Ages. Does this mean that there was no development of knowledge elsewhere? Of course it does, but the study of other geographical areas would exceed the purpose and scope of this book. An exception must be made for India, whose exchanges with the Arab world were not negligible. The Mahassidhanta, a work composed towards the end of the seventh century (the book is called Zij al-Sindhind in Arabic), was important for Arab mathematicians, notably through its introduction to the calculation of ardha-jyā, which later became sine, much simpler than the bowstrings used by the Greeks. Al-Bīrūnī- Régis Morelon- mentions, in hisTables dedicated to Masʿud, an Indian work, the Āryabhatiya, written in 499 by the astronomer Āryabhata(the book is calledal-Arjabhar in Arabic). This Indian scholar considers the Earth to be round and even hypothesizes that it may have a rotational motion on itself to explain the motion of the other stars. Al-Bīrūnīasserts that this hypothesis would not change anything in the tables of celestial motions because the results would be the same in a fixed reference frame and in a moving reference frame He even certifies that the motion of a falling body on the Earth would remain apparently vertical because it would be driven by this rotation. But he then calculates the speed that a point on the Earth's surface would have, assuming this rotation. Noting the enormity of the result (in our system of units, nearly 1,700 km/h at the equator), he concludes that such a speed would have to modify in a notable way the speeds of the terrestrial bodies, which "is not observed[66](#66__Morelon__1997__p__66_69)". Although this Arab rejection of the Earth's motion was made in different terms from the one that led to Galileoin Europe in the17th century, it was based on the same Aristotelian-Ptolemaic conception of a universe hierarchically divided into concentric spheres, whose stars are in uniform circular motion and rotate as a whole around a motionless Earth.

This brief survey has not allowed us to mention all the texts, but it does provide essential reference points. During the late Middle Ages, Aristotlereached the West largelythrough Arabic translations. The contributions of Arab astronomy, as well as the writings of certain Arab natural philosophers, accompanied or even preceded(as is the case for the work of Avicenna) the (re)discoveryAristotelian corpus. This transmission in the 12th and 13th centuries of the Aristoteliancorpus and of the commentaries and treatises coming from the Arab sciences provokes an important transformation of knowledge compared to the early Middle Ages, whose culture was built, as we shall see, on the bits and pieces saved by Isidore of Seville, Boethiusand a few others, but this does not mean that the idea of sphericity had been lost.On the other hand, it is certain that Cosmasnever professed by medieval thinkers, any more than those of the other Nestorians we have mentionedon this point that we would like to insist in conclusion of this first part: Cosmasnot belong to the Fathers of the Church, he was neither translated into Latin (he was therefore unreadable during the whole of the Middle Ages), nor was he approved, still less promoted, by the authorities, both religious and political His work had no impact on medieval knowledge. Umberto Ecoeven notes that it was "only after its English publication in 1897" that Cosmaswas "considered an authority on the 'dark ages'"[67](#67__Eco__2003__p__365). To make it the paragon of Western representations is not only a matter of misjudgment, but of bad faith. This is an excellent example of how to consider a source in its context.

Notes

[1](#1_2). Delattre-Biencourt, introduction to Theon,Lire Platon.

[2](#2_2). Theon,Reading Plato, p. 239

[3](#3_2). Ibid, p. 242.

[4](#4_2). See Aristotle,On Heaven, II, IV.

[5](#5_2). Ibid, p. 243.

[6](#6_2). Theon,Lire Platon, p. 244-245

[7](#7_1). Delattre-Biencourt, 2010.

[8](#8_1). Macrobius,Commentary, I, chap. XVI, § 16.

[9](#9_1). Ibid, I, chap. XX, § 20.

[10](#10_1). Ibid, I, chap. XX, § 21.

[11](#11_1). On these theories see Randels, 1980, p. 11ff.

[12](#12_1). Macrobius,Commentary, II, chap. v quoted by Duhem, t. III, p. 65

[13](#13_1). Macrobius,Commentary on the Dream of Scipio, Copenhagen, Kongelige Bibliotek, ms. NKS 218 4°, fol. 34r (Source Wikicommons).

[14](#14_1). La Sphere de Jean de Sacrobosco, Paris, Hierosme de Marnef et la veufve Guillaume Cavellat, 1584, copy of the B.M. of Bordeaux, document digitized by the Uranie Library: http://uranie.huma-num.fr/idurl/1/1479.

[15](#15_1). Le Bœuffle, 1988, p. 178

[16](#16_1). Ibid. , p. 180.

[17](#17_1). Copernicus,De revolutionibus, I, 10, p. 35.

[18](#18_1). Antès, 1983, p 289.

[19](#19_1). Ibid. , p. 292.

[20](#20_1). Pliny,Natural History, 1877, I, II, chap. 64, p. 130.

[21](#21_1). Ibid. chapter 65, p. 130.

[22](#22_1). Lactantius,Institutions divines, book III, chapter 24.

[23](#23_1). Lucretius,De natura rerum, book I, V, 1060.

[24](#24_1). Origen,De principiis II, 3, 6, PG 11, col. 83.

[25](#25_1). Duhem, 1913, II, 2, p. 394

[26](#26_1). Basilof Caesarea,First Homily, 8E-9A, p. 121.

[27](#27_1). Ibid, p. 129

[28](#28_1). Duhem, 1913,III, p. 56.

[29](#29_1). Giet, in Basil,Homilies on the Hexameron, p. 69.

[30](#30_1). Ribémond, 2001, p. 227.

[31](#31_1). Job 23, 2.

[32](#32_1). Job 26:7.

[33](#33_1). Ps 74:4.

[34](#34_1). Ambroseof Milan,Hexameron, I, VI.

[35](#35_1). See other examples in Mayaud, 2005, vol. II, file A.

[36](#36_1). Augustine, City of God, book XVI, chapter 9, p. 663.

[37](#37_1). Ibid. book XVI, chapter 9, p. 663.

[38](#38_1). Ibid. book XII, chapter 25, p. 413.

[39](#39_1). Origen,De Principiis, II, 3, 6.

[40](#40_1). Agaësseand Solignac, in Augustine,La Genèse au sens littéral, p. 577.

[41](#41_1). Augustine, Confessions, V, III, p. 152.

[42](#42_1). Procopiusof Gaza,Commentarii in Genesim, I, PG 87, col. 69.

[43](#43). Ps 135:6.

[44](#44). Scheuchzer, 1735, p. 53; Mayaud, 2005, vol. I, p. 104.

[45](#45). Brown, 2011.

[46](#46). Ibid.

[47](#47). Cosmas,Topology, 1968, vol. I, p. 264.

[48](#48). Ibid, p. 290.

[49](#49). Philopon,Creation, II, 4, p. 87.

[50](#50). Ibid, III, 13, p. 154.

[51](#51). Defaux, 2014.

[52](#52). Gutas, 2005, pp. 95-105.

[53](#53). Avicenna,Book of Healing, Part 2, Treatise on Heaven, chap. 3, p. 20 (of the Arabic text), trans. Sylvie Nony.

[54](#54). Ibid. at 20-21.

[55](#55). Ibid. chapter 6, pp. 56-57.

[56](#56). Arab-Latin transmission see Libera, 2004, pp. 346-350

[57](#57). Tixier du Mesnil, 2010, p. 23-25.

[58](#58). Arnaldez, 1962.

[59](#59). Kennedy, 1997, p. 219

[60](#60). Maçoudi, 1966, p. 43.

[61](#61). Morelon, 1997, pp. 39-40

[62](#62). Al-Farghānī, Compendium, chap. 3, p. 11 (of the Arabic text), trans. Sylvie Nony.

[63](#63). Idrīsī,Geography I, p. XX.

[64](#64). Ibid, p. 1.

[65](#65). Ibid, p. 2.

[66](#66). Morelon, 1997, p. 66-69

[67](#67). Eco, 2003, p. 365

CHAPTER III

The sphere in the West, from the early Middle Ages... to the end of the Renaissance

A fairly widespread thesis on the evolution of the Christian Church - put forward first by the philosophers of the Enlightenment - tends to present the first centuries of the Middle Ages as a period of primitive innocence that quickly became the bedrock of ignorance and superstition, which would have been able to overcome the cosmological theses inherited from Greek antiquity. We have seen what happened to Basiland Augustine; the only critic of sphericity with a certain legitimacy - Lactantius- precedes them in time It is without question the model of a spherical Earth that passes naturally from late antiquity to the early Middle Ages, thanks to the work of men who are both men of science and men of the Church. It is true that astronomical and cosmological knowledge was frozen during this period, and it is quite true that some of it, the most technical, was lost. The works whose transmission we have followedpopularize results more than they expose scientific methods, and the demonstration of Eratosthenes, for example, seems less and less understood The Christian society, which was becoming more organized, adopted the heritage of classical scientific culture in antiquity, but did not pay the same attention to it as the Greek society that had produced it, except within the schools of philosophy in Athens and Alexandria. Historian Peter Brownnotes, however, that the conversion of Emperor Constantinein 312 would probably not have taken place "had it not been preceded by the conversion of Christianity to the culture and ideals of the Roman world[1](#1__Brown__2011__p__72)". Nor can the period that followed be reduced to the idea of the greatness and decadence of empires due to the fall of Rome in 476. And, in any case, the shape of the Earth was not forgotten and even less fought by the religious and political institutions of the time, nor by the men in charge of saving Roman knowledge. In the transition period between late antiquity and the Middle Ages of the sixth and seventh centuries, Boethius(† 524), then Gregory the Great(† 604) and especially Isidore of Seville († 636) were the artisans of a transmission - certainly partial but in no way "retrograde" - of astronomical knowledge

In this part, which deals with the long term, we will not evoke all the texts or all the advances in knowledge. We will try to establish three essential milestones in order to respond to the myth of the flat Earth: the transmission of ancient culture in the early Middle Ages; the dissemination of scientific knowledge in the Middle Ages, at the university and outside, particularlyin French for a non-Latin-speaking readership; and the evolution of these questions during the Renaissance

# I. THE TRANSMISSION OF ANCIENT KNOWLEDGE

The assertion of the medieval belief in a flat Earth is sometimes accompanied by the argument that the first centuries of the medieval period had forgotten Greek knowledge. It is perfectly true, in fact, that Greek manuscripts were not transmitted to the West before the 12th or 13th century for Aristotle, and even later forPtolemy'sGeography (it only arrived in Florence in the14th century), but capital elements of Greek knowledge were passed on to Latin scholars[2](#2__Pour_un_exemple_illustrant_la)It is through the Latin route that the main lines of the latter were transmitted, taken up again in PlinyNatural History, in the adaptation that Ciceroto theTimaeus or the version given by Apuleiusof thepseudo-AristotelianDe mundo. Without providing mathematical calculations or precise astronomical data, the preserved ancient Latin works dealing with natural history or philosophy take up the concept of a spherical Earth. As in the case of the attention to be paid (or rather not to be paid, as far as the Western Middle Ages are concerned) to the work of Cosmas, it is important to understand the general context of transmission of ancient knowledgedeny a form of reflux of knowledge and especially, for the field that interests us, of research in astronomy, but simply to show that this partialGreek knowledge did not affect the concept of terrestrial sphericity

## Overview

The history of this knowledge is first of all linked to the history of the path of the manuscripts. However, after the fall of the Roman Empire, which caused the disappearance of its schools and the severing of ties with the Greek world, the establishment of an official physical science and cosmology, as well as the paths of access to knowledge in the early Western Middle Ages, were reorganized. Knowledge became the work of men of the Church, and more particularly of monks. It is indeed first of all a library knowledge, which is based, in the secular domain, on some texts of classical Latin antiquity, such as that of Pliny, on the last representatives of the late pagan manuals, such as theMarriage of Mercury and Philology of MartianusCapella, which we mentioned above, and on the fragment of theTimaeus transmitted via its translator and commentator Chalcidius, accompanied by a large part of the astronomy of Theonof Smyrna. It is also a fundamentally Christian knowledge, logically drawn from the hexameric writings of the early Fathers, thus transformed into vectors of scientific knowledge. It is therefore above all a profoundly chosen knowledge, as Olivier Boulnoiswhen he writes that from the "moribund literate paganism", a few men have indeed chosen to save "what seemed to them to be worth saving"[3](#3__Boulnois__1998__p__213).

It is also, in the very early days, a knowledge enclosed in monastic thought and space, but which very quickly aspires to leave it, as the work of Cassiodorus., mayor of Theodoricin 523, was the first to attempt to restore ancient knowledge and, in particular, to preserve Greek culture in the Latin world, which had been put out of reach by the division of the EmpireHe succeeded in creating the monastery of Vivarium, in the south of Italy, for which he wrote a complete program of intellectual training, theInstitutions of Divine and Secular Letters, with the idea of eventually training teachers capable in turn of spreading the culture thus reconstructed. The Institutions are a distant ancestor of medieval encyclopedism, adapted to monastic life, but they are not yet an encyclopedia: they are rather a commented and reasoned bibliography, with numerous extracts from texts, which theorizes in particular the system of liberal arts.

At this time, neither the sphericity of the Earth, nor the ancient themes are lost. The Roman philosopher Boethius(† 524), evokes the sphericity of the Earth (he speaks of "rounded mass of the Earth") in hisConsolation of philosophy[4](#4__Boece__Consolation_de_la_phil)and especially Bedethe Venerable - an Anglo-Saxon monk († 735), read at least fragmentsPlinyNatural History (he borrowed extensively from Book II), probably Lucretius, and of course the writings of the early Fathers. He takes up the idea of the sphericity of the Earth in hisDe natura rerum, the title of which (we will talk about it again with Isidore), signs the continuity with the ancient culture.He asserts repeatedly that the Earth is aglobe and justifies this with arguments of an astronomical nature: "The Earth is similar to a globe [...], hence the fact that stars in the northern part of the sky are always visible to us, whereas stars in the southern part are never visible[5](#5__Bede__De_natura_rerum__XLVI)".

Bedecontinues the debate on the possible existence of antipodean inhabitants.A passage of his text provokedretroactive mockery in the15th century[6](#6__Mayaud__2005__vol__I__p__91)when it was discovered that the torrid zones could be inhabited:

We must not give any credence to the fables of the Antipodes, and no historian reports having seen, heard or read that people crossed the Tropic of Capricorn towards the southern regions, so that, having left it behind them and having passed the heats of the Ethiopians, they would have found beyond them dwellings tempered on the one hand by the heat and on the other hand by the cold, and thus habitable for mortals[7](#7__PL_90__col__456_457).

Bedereferring here to the (impossible) existence of antipodians, not to the antipodes themselves, as the end of this quotation showsHe is also the author of numerous biblical commentaries, including a commentary on the book of Exodus entitledThe Tabernacle, in which he exegetes the ascension of Moses and the divine instructions for building the Tent of Meeting, the first temple of the people of Israel in exodus. This exegesis emphasizes the symbolic and spiritual meaning of these instructions and of the utensils describedin the biblical text, contrary to the reading developed inCosmasChristian Topology.[8](#8__Bede__Tabernacle__livre_II__p).

The image of the Christian world was truly established at the dawn of the seventh century, when the Seville bishop Isidore made available to a public of cultivated laymen an organized synthesis of monastic knowledge resulting from the Christianization of ancient material, and returned to the ancient practice of the De natura rerum. The formal and scientific model thus constituted by his two major works, the Etymologies and the De natura rerum, was then tirelessly imitated and copied. The persistence of the knowledge he managed to synthesize is remarkable: the scholarly writings of the period from the writing of the Etymologies to the dawn of the twelfth century are all marked by their indebtedness to the Sevillian, whether it be BedeDe natura rerum (8th cent,) where the author corrects Isidore by massive borrowings to Pline, ofDe rerum naturis (or De Universo,) of RabanMaur(IXth century), which works especially to moralize the isidorian matter or, to close the period, of the Imago mundi of HonoriusAugustodunensis (XIIth century).

From the end of the twelfth century onwards, the main sources are, on the other hand, the texts of Aristotleand the Greek and Arabic astronomical texts[9](#9__Lindberg__1979)The discovery of Aristotle's thought and the birth of the Greek Neoplatonism, which was to become a major factor in the development of this new theory, were the.The discovery ofAristotle'sthoughtand the joint birth of the medieval university established a new way of conceiving and using knowledge, as well as a new relationship between scholarly and popularized knowledgeTheAristotelian corpus gradually became the basis of the teaching of natural philosophy, which all students of the Parisian university model had to pass, and which at least introduced them to the cosmology of the Treatise on Heaven, even if they were not always trained in a very advanced way in mathematics. From the thirteenth century onwards, however, a textbook on astronomy, the Tractatus de Sphæra by the English monk - teaching in Paris - Jean de Sacrobosco, testifies to the minimal level of astronomical knowledge inculcated in the students (seebelow).

Scholasticism, on the other hand, brings Aristotle's theories up to dateand discusses them through scientific commentaries (such as those of Albertthe Great) or more essentially theological ones (such as those of Thomas Aquinas) The age of Aristotelian science is also the age of academic commentary, which will be able to ask the theoretical questions suggested by Aristotle's texts and which the patristic literature had passed over in silence. It thus raises many problems linked to the ambiguities of the texts, to the problems of translation or to the confrontation between the science of the Stagirite, the teachings of the Bible and the conclusions of the hexameral literature. The debates on these "profane novelties" or on the possible existence of "contrary truths" sometimes led to censures. They gave rise to warnings by Pope Gregory(in 1228) and prohibitions by Robert de Courçon(in 1215) and by the bishop of Paris, Étienne Tempier(in 1270 and 1277), which mustanalyzed with infinite precautions[10](#10__Libera__2004__p__363_370_et). However, we are far from an intellectual universe on which a religious leaden blanket would weigh and where scientific controversies would end up in bonfires, far from the Middle Ages as it is unfortunately caricatured in Jean-Jacques AnnaudUmberto Eco's novel,The Name of the Rose (although it is obviously not in the novel). In all the cases, and whatever the acuteness of the disputed questions, the sphericity of the Earth is never part of the points debated. On the contrary, the reading of the texts testifies to the persistence of a spherical Earth, which one finds at the same time in the first encyclopedias in the vulgar language.

## Corpus

The corpus of medieval scientific texts, whether scholarly or literary, that can illustrate the continuity of astronomical knowledge is extremely important. This corpus is also quite remarkable for the variety of its theoretical perspectives: one can distinguish, in chronological order, the Isidorean texts and their heirs (RabanMaur and Honorius), then the commentaries and glosses of thetwelfth century, in dependence on the Timaeus, among which one notes the appearance of the first philosophical commentaries on Genesis, such as that of Thierry de Chartres, which encompasses exegetical works in a new, broader philosophical perspective of reorganization of knowledge and renovation of philosophy. TheTractatus de sex diebus operibus is indeeda commentaryad litteram of the Genesis in which Thierry tries, like his ancient predecessors, to give a rational explanation of the physical phenomena which it evokes.

Next comes the immense body of commentaries and glosses, sentences, compendia of Aristotle, including the commentaries on theTreatise on Heaven, the On Generation and Corruption, and the Meteorologicals, a body of work that was later regularly edited until the end of the 16th century. Among these medieval sources, one must also count the Summa Theologica of Thomas Aquinaswhich, in questions 46 to 75, systematically returns to the theological and philosophical implications of the Scriptures and confronts the interpretations of the Fathers and those of the philosophers in the light of scholastic methods

In connection with the development of philosophy, the first great encyclopedias in Latin also appeared, firstthose of the 12th century (to that of Honorius, one can add theDidascalion of Huguesde Saint-Victor) and those of the13th century above all, resulting from the need to sort out and organize the growing mass of knowledge that had come to light. From the end of the twelfth century to the 1250s, four major texts were written, all of them composed by monks belonging to mendicant orders (their primary purpose was to serve as preachers): Alexander NeckamDe naturis rerum first, thenBarthélemythe Englishman'sDe proprietatibus rerum, translated into French in thefourteenth century by Jean Corbechon,Thomas de Cantimpré'sLiber de natura rerum, and finally the most ambitious and voluminous of the medieval encyclopedias: theSpeculum maius by Vincent de Beauvais.

These scholarly texts, often massive, intended essentially for clerics and written in Latin, were as if redoubled by shorter texts in the vernacular, intended for a literate and curious public. They testify to the birth of a new genre, that of a literary encyclopedism from which the 16th century inherited the taste. The Image of the World by Gossuinde Metz,Li Livres dou Tresor by BrunettoLatini, thePlacides et Timeo (anonymous) and the Book of Sidrac punctuate the 13th century and each deliver their vision of knowledge. The appearance of a Latin and then French literature centered on cosmology (or on knowledge as a whole) is thus the sign of the passage of scientific knowledge from the milieu of schools and universities to a common culture, which is not the popular culture (extremely difficult to apprehend), but the culture of the literate lay elites. It attests the major importance of the question of the nature of the world (thus of that of the relationship between the man and the world) in the thought of the educated men of time and constitutes a good index of the real impact of the progress of the knowledge[11](#11__Ribemont__2001).

These popularizers, by using scientific and philosophical texts, by translating them, by condensing them or by developing them, testify to the impact that the irruption of Aristotelian thought had. The texts in vernacular language thus appear characteristic of the acquisition of a new scientific knowledge and of the epistemological progress made outside the world of intellectuals[12](#12__Ducos__1998). the content of encyclopedias for a non-academic readership evolves at thesame pace as that of scholarly worksAlain de Liberadefines this progressive appropriation of ancient knowledge during the long Middle Ages as follows: "the Middle Ages that we present do not yet know the modern distinctions between "scholasticism", "mysticism" and "philosophy"; the movement of ideas is not separated from the organization of intellectual life; the rhythm of thought follows the pace of translations and sets its own pace; thinkers are living beings who read, write and teach in defined worlds[13](#13__Libera__1989__p__4)".

# II. SOME GREAT WITNESSES

Rather than trying to make an exhaustive study of the available texts, we would like to give a kind of sampling of astronomical knowledge and its context of transmission, in time but also in the different levels and uses of knowledge. It is not a question of redoing the history of medieval astronomical and mathematical theories, but of following our guiding thread, the notion of the sphericity of the Earth, in works intended for different readerships.

## From Antiquity to the High Middle Ages: Isidore of Seville

Isidore of Seville († 636), bishop of the eponymous city, is the first figure to attract our attention. His work, which collects ancient knowledge,considered by specialists both as the "last of the Fathers of the Latin Church[14](#14__Boulnois__1998__p__225)"and as the founder of medieval encyclopedism[15](#15__Ribemont__2001). His considerable importance during the medieval period and again during the Renaissance is attested to by the frequency of quotations from his texts[16](#16__Deluz__Ribemont)His considerable importance during the medieval period and still in the Renaissance is attested by the frequency of quotations of his texts, by the presence of his works among the incunabula, i.e. the works printed between the invention of printing and 1500 (the Etymologies and the De la nature were published in quick succession as early as 1472 in Augsburg, a sign that they were a safe bet for the recent printers) or by the praise he received from Dante, who saw him as one of the greatest minds of the Christian West:

See the burning spirit shine further

Of Isidore, Bedeand Richard

Who was more than a man in contemplation[17](#17__Dante__Divine_comedie_____Pa).

Isidore's work constitutes a major turning point in the history of Christian knowledge, because it reorganizes, very early in the High Middle Ages, the vestiges of scientific knowledge for the laity. We owe him mainly the Etymologies, the first true sum of the medieval West, and above all, for what interests us, a De natura rerum, which, unlike the hexameral exegeses, is a primarily scientific work that obeys a methodical descriptive organization, instead of following the narrative order of Genesis.

therefore a manual, defined as much by its relationship to inherited knowledge as to its intended audience; it wascommissioned by the Visigoth king Sisebut, who wished to know more about the causes of natural phenomena, perhaps in order to be able to use his knowledge to combat the ignorance and superstition that resulted from them For Jacques Fontaine, it is even possible that the writing of the treaty was more directly provoked by the occurrence of a series of three eclipses, including a total eclipse of the Sun, between the beginning of March and the end of August 612, which would have revealed the depth of the "primitive fears in front of the phenomena of nature" and the rise in power of the "apocalyptic anguishes"[18](#18__Fontaine__introduction_a_Isi) :

The identity between the title of Isidore's treatise and that of Lucretiusis therefore not at all paradoxical This apparently fortuitous connection guides us well towards the deep intention of the work: it is intended to react against the fear in front of the natural phenomena and to provide the intellectual elite of the kingdom with a convenient manual where it can find the natural explanation of these phenomena[19](#19__Ibid___p__6).

Isidore writes clearly in his address to Sisebutthat "the knowledge of nature is not a superstitious science, as long as it is considered with sound and sober knowledge[20](#20__Isidore__De_natura_rerum__p)"and also specifies that he presented his knowledge "like the ancient writers, and preferably as it is found in the works of Christian writers[21](#21__Ibid___p__166)". It is thus a question of merging the pagan scientific heritage with thatthe Christian authors, by compiling the knowledge still available The scientific developments are largely inspired by Aristotelian and Neoplatonic cosmography, to which he adds a Christian and allegorical exegesis. He thus endeavored to disseminate an encyclopedic knowledge, both secular and religious, at a time when many of the original Greek works were no longer in circulation.Jacques Fontaine, who has examined the twenty or so manuscripts, has shown that the illustrations they contain come from "school textbooks that popularized, for ancient schoolchildren, the philosophy of Platoand Aristotle[22](#22__Fontaine__1990)".

If the purpose of the Fathers was to comment on Genesis, the De natura rerum is indeed an encyclopedia that deals with all aspects of the knowledge of nature. His long description of the heavens leaves no doubt about his astronomical system or the fact that the Earth is for him a sphere at the center of the world. His description of the Earth is also explicit: "in their definition of the world, the philosophers say that there are five circles, called by the Greeks parallel, that is to say zones, between which the globe is divided[23](#23__Isidore__De_natura_rerum__p)". He also takes up the theory of the elements, exposing in turn the theory of Plato(via Chalcidius) and that of Aristotle,via Ambrose[24](#24__Ibid___p__212_216). It is thus obvious that Greek knowledge was not lost at the dawn of the Western Middle Ages, even if it survives only in its broad outlines, stripped of its long philosophical developments and mathematical demonstrations.



Isidore, moreover, is also the author of one of the first maps called in OT (orbis terrarum) [25](#25__Etimologias__Mapa_del_Mundo). These maps - which we will discuss below - circulated throughout the medieval period.The work of the Sevillian was integrated into the reform project conceived by the Church in the following century, of which a famous craftsman was Charlemagne.It contributed to Carolingian and post-Carolingian culture, as evidenced by the rich manuscript tradition of theeighth, ninth, and tenth centuries. Beyond that, it contributed to the development of scholarly culture in the universities from the 13th centuryonwards.In the absence of recourse to experiment or observation, the scientific material transmitted by Isidore was hardly enriched by new contributions, but it is the tangible proof of the survival of the main lines of cosmological knowledge and is an authority until the return of Aristotleand Greco-Arabic astronomy

## A witness to university education: Sacrobosco

To have a reliable witness to the doctrines circulating in the medieval world, it is necessary to rely on the content of the teachings. Indeed, as we have already mentioned, to say that in the Middle Ages "one" believed that the Earth was flat raises the question of "who": one cannot consider as a valid witness of knowledge the population of those who do not know, especially since one hardly has any information on what a peasant in Aveyron or a craftsman in Correze knew or believed. If certainly the great majority of the population, illiterate and illiterate, probably did not wonder if the Earth was spherical or flat, one has on the other hand more reliable data on the medium of the educated and, starting from the appearance of the universities, on the official contents of the teaching. However, among the educated and their entourage (because it should be remembered that one does not necessarily know how to read even in the highest spheres of society, and that in noble circles, for example, books are read aloud), there is no doubt that sphericity was not only known, but was not discussed.

The best evidence of this is the content of a small manual of initiation to astronomy, also used as a popularization work, and which knew an immense success, from the moment of its writing in the beginning of the 13th century: the Tractatus de Sphæra of the English monk Johannes or John of Sacrobosco(John Holywood in English or John of Halifax). We know that Johannes studied at Oxford, and then was accepted as a professor of mathematics in Paris, probably in 1221, to teach thequadrivium (the fourmathematical disciplines of the medieval university: arithmetic, geometry, astronomy and music) at the University of Paris

He wrote this small text for his art students. Probably written around 1230 (the oldest surviving manuscript dates from 1240), this elementary textbook synthesizes and simplifies the essential contributions of Greco-Arab astronomy. Its success is attested by the large number of surviving manuscripts, by the fact that we know from the roles of the universities that it was used from the middle of the 13th century by the University of Paris and then by all the major European universities until the beginning and even the middle of the 17th century, as well as by its presence among the first printed works (a first edition was given in Ferrara in 1472, a sign, as with Isidore, that it was a sure-fire success in the book trade.) In the 16th century, it had an extraordinary vogue and was published by many important humanists and pedagogues, but also translated into the vernacular (two French translations are known for the 16th century, there are several in Italian, and it was also translated in Spain, England, Germany...) and adapted by mathematicians, who took up the model by writing their own Sphere in order to integrate the new knowledge and developments of astronomy (see for example the Sphere of Oronce Finé, first professor of mathematics at the Collège royal, progressively written in Latin and then self-translated into French in 1551)

Throughout the late Middle Ages and the Renaissance, this treatise was the subject of a large number of commentaries, the last notable one being that of the great Jesuit mathematician Christophe Clavius, which wasrevised and republished several times in the late16th and early 17th centuries (Christophori Clavii Bambergensis ex Societate Iesu, In Sphæram Ioannis de Sacro Bosco Commentarius). In the 16th century, in France, it is thus very easily accessible in printed version, in Latin or in French, with or without commentaries: it had at this date long left the frameworks of the University and served as a work of popularization in all the circles of the readers-writers (the skeptics and the curious ones can consult editions of it of the Rebirth, digitized in very high definition, on the site of the numerical library of astronomy Uranie[26](#26__http___uranie_huma_num_fr)where you can find copies with or without commentary, in different languages, and some of them with numerous illustrations). Let us insist in particular on the role of the pedagogues: Lefèvred'Étaples, a major humanist teaching in Paris at the turn of the15th and 16th centuries, Philip Melanchthon, Lutherand reformer of the Germanic universities, Oronce Finé, a mathematician and royal reader chosen by François Ito teach mathematics and popularize it at the Collège Royal, Élie Vinet, principal of the famous Collège de Guyenne in Bordeaux (where Montaigne studied, a college which was then "the best in France" according to the author of theEssais)All of them edited and sometimes annotated the treatise of Sacrobosco, which was the official basis of university teaching, both in Catholic and Reformed landsA beautiful Latin edition of 1527 at Simon de Collines, in Paris, is thus very clearly established, says the title,ad utilitatem studentium philosophiæ parisiensis.

What can we learn from this work, which was used for more than four centuries to train all students of the arts, but also all readers wishing to acquire the rudiments of astronomy (a science that was very much in vogue during the Renaissance)? The work, which is very brief, is divided into four books, the first of which deals with the form and general structure of the sphæra mundi, the sphere of the world, i.e. the cosmos as a whole, based on a definition given by Euclid (a good example of the maintenance of the reference to Greek knowledge). He then deals with the Earth and its place at the center of this world composed of concentric spheres, following the system inherited from the AristotelianTreatise on the Sky (which is commented on in all universities) and the mathematical astronomy of Ptolemy. The second book describes the circles that are used to locate oneself on the celestial sphere and that are still used today to structure the globe: the equator, the tropics and the poles, as well as the ecliptic circle, the colures (the two main meridians that intersect at right angles at the poles), the horizon line and the zodiac. The third describes the rising and setting of the constellations and the duration of day and night according to the periods of the year and in the different geographical areas. It teaches you how to find your way on the sky map and to understand the most easily observable celestial movements. The last one explains the complicated movements of the planets around the Earth and the mechanism of eclipses.

When a reader of the Middle Ages or of the Renaissance opens this short work, he quickly reaches the chapters devoted to the Earth: the fifth chapter of book I is entitled (what non-Latinists will understand without difficulty) Quod terra sit rotunda.Here is what the text says in the French translation of Guillaume Des Bordes, here in the 1584 edition (we modernize the spellings):

The roundness of the Earth is manifest to us as follows. The signs of the zodiac, and other stars, do not rise and set in the same way and manner to all men who inhabit the Earth in different places: but rise and set first to those who are nearer to the East[27](#27__Jean_de_Sacrobosco__Sphere).

The text states various experimental proofs of terrestrial sphericity, and anticipates possible objections:

Moreover, if the Earth were planar from East to West, the stars would rise as soon for the Westerners as for the Easterners [the stars would rise at the same time for the Westerners and the Easterners], which appears to be false. Moreover, if the Earth were planar from Septentrion to Midi [from North to South], the stars would always be apparent to the one who would be in Septentrion, no matter where he was or where he was going: which is shown to be false. And it [although it] seems to the sight of men that the Earth is planar: but this happens because of its great quantity[28](#28__Ibid___p__32).

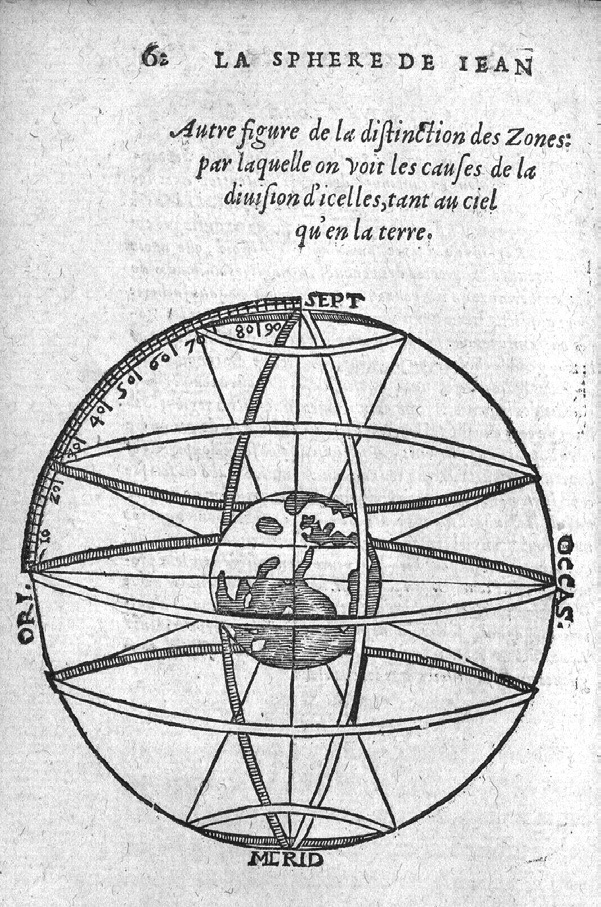
Among the proofs, we find a demonstration of the fact that the Earth and the sea are conglobated and form together a single sphere:

Let a mark be placed at the edge of the sea, and let the ship leaving the port move away so much that the eye of the one who is at the foot of the mast can no longer see the aforementioned mark, and the ship being there stopped, the eye of the one who will be at the top of the mast will see this mark very well[29](#29__Ibid___p__33).

This is perfectly illustrated by a small pedagogical illustration that follows the text[30](#30__Credit_photo___La_Sphere_de).



Des Bordes, here, only translates into French elements that are already found in the text of 1230, just as he illustrates his edition with images that were already found in the manuscripts: on the sphericity of the Earth, therefore, there is nothing new under the sun of the Middle Ages or of the Renaissance "We know that the Earth is round, and we can demonstrate this by simply observing the shape of the shadow cast by the Earth during lunar eclipses. Let us note that the very fact of drawing circles on the celestial sphere as a means of marking the different climatic zones is another sure indication of the knowledge of sphericity. In all the medieval works of astronomy is thus found the image of the armillary sphere, surrounded by its circles[31](#31__Credits_photos___ibid).



## Outside the universities: knowledge in the vulgar language

The Treatise of the sphere of Sacroboscois not a confidential work. Even at the time of the manuscript, when there were few books and when the number of scholars represented only a very small part of the population, it circulated throughout Europe and was widely read. Traces of this astronomical knowledge can also be found in other medieval texts, written in Latin, but also more and more in French, and in particular in all the encyclopedic literature that flourished from the13th century onwardsand disseminated knowledge about nature: Gossuinde Metz'sImage du monde, in verse and then in prose, thePlacides et Timeo, ou li secrés as philosophes, Brunetto Latini'sLi Livre dou Tresor,La Petite Philosophie, the Secret des secrets in verse and prose, and the Sidrach, all of which were written in French for the curious world and disseminated outside of schools and universities the knowledge of specialists in simplified form. This point is particularly important because studies have shown that these works reached what has been called the readers of "middle culture", without university training and who are not nobles either, but have risen in society and made their fortune thanks to their skill and work. Christine Silvisums it up well, these books were written

in order to respond to the demand of the laity, of the people of the world who, in their turn, are eager to have access to science and at whose disposal it is necessary to put works of scientific popularization. The infatuation of this new clientele for all that relates to the physical world, to the small philosophy of the universe, will thus require an effort of adaptation of the cleric to this public of non-specialists[32](#32__Silvi__2003__p__346).

Now if they do not all explicitly speak of astronomy, they at least always speak of physics and mention the shape of the elements, including the earth, always described as spheres. The Image of the World, considered as a work of broad popularization (considering the readership of the time, of course) is perfectly explicit: the chapter of 11the prose version, entitled "How the Earth stands in mid-world", states that "if such a thing could happen that there was nothing on Earth, neither water, nor anything else that would divert us from our pathanywhere we go, one could go all around the Earth, or man, or beast, anywhere he wanted, as a fly would go around a round apple". The work describes precisely how a man who manages to walk without obstacles would find himself at the antipodes and then return to his starting point:

so that when he came under us, it would seem to him as if we were under him, so as he would make him to us. For he would stretch out his feet towards ours and his head straight towards the sky, just as we do here, and his feet towards the earth. And if he were to go forward again, in front of him, he would go so far that he would return to the place from which he first started. And so it would happen that if by chance two men were to leave each other and go one towards the east and the other towards the west [...] it would be appropriate that they should meet below the place from which they set out. And then they would return to the place from which they first started. For then would have made each one a turn around the Earth[33](#33__Voir_pour_le_texte_non_moder).

In the less astronomical Placides et Timeo, we find this paragraph, which deals with sphericity from another angle:

So you can certainly know that the elements have body; and for what you asked me which bodies they are, I tell you that they have round body. Each of the elements is round and the whole World is round[34](#34__Placides_et_Timeo__SS_134__p).

The image of the egg, regularly used by medieval encyclopedists to describe the structure of theworld as well as the nourishing function of the earth, is also present and referred to Ovid[35](#35__Ibid___SS_118__p__50).

An important point must be made here. These medieval "small encyclopedias" in French were inspired by the knowledge contained in the commentaries on Aristotleand his successors and in the "great" encyclopedias, written in Latin, such as theSpeculum maius by the Dominican Vincent de Beauvais (13th century). These works are the work of clerics, of men of the Church, and they were intended primarily to instruct the members of the various religious orders: among those we mentioned above, Alexander Neckam, author of aDe natura rerum, in the twelfth century, was a friar and then abbot of the Augustinians of Cirencester, England; Albertthe Great (thirteenth century), author of a considerable scientific and philosophical work that continued to be read assiduously during the Renaissance, was a Dominican; Bartholomewthe Englishman (also 13th century), one of the first encyclopedists, author of a famous Liber de proprietatibus rerum (Book of the Properties of Things) is an English Franciscan.In the Middle Ages, scholars were men of the Church (Copernicushimself, again, was a canon) None of them said that the Earth was flat. On the contrary, the demonstrations of sphericity, found in French texts, are perfectly topical. The movement of writing in French, moreover, corresponds to a movement of secularization and diffusion of knowledge. The text ofL'Image du monde was written between 1250 and 1300: it shows that the sphericity of the Earth was not only perfectly admitted by clerics and scholars, but also diffused in the lay readership without any hindrance or difficulty.

## The case of the Imago mundi of Pierre d'Ailly

One can complete these remarks on the circulation of knowledge from the sphere to the Middle Ages by a quick point on geographical knowledge that confirms the transmission of Greek knowledge. As Patrick GautierDalché's work has shownifPtolemyGeography is not present in the Latin libraries of the Christian West, the knowledge of the Greek scholar is far from being completely lost, and transits, like astronomical knowledge, first through Cassiodorusand MartianusCapella, then through the Arab contribution, two ways that make available the essential elements.P. GautierDalché concludes:

One cannot be sure that these references were always exactly understood, nor that they had a decisive influence on the representation of space. But that this knowledge was indirect and partial does not mean that it was imprecise and confused. Thanks to them, the notion of a good part of the content of the book remained[36](#36__Gautier_Dalche__2009__p__142).

He thus explains that Western knowledge mainly lacked "the reference to the methods of drawing the sphere on a plane[37](#37__Ibid___p__146)"but, again, the knowledge was not lost, and Ptolemaic geography confirmed the Ptolemaic astronomy of the sphere.

The text of the Geography, on the other hand, returned to the West at the end of the fourteenth century: although it is not yet known exactly how, it is certainthat a manuscript arrived in Florence in the 1390s and a translation from Greek into Latin was immediately undertaken. However, it was outside of Italy, and particularly in France, that the Greek knowledge thus completely restored was confronted with medieval geographical knowledge, in particular that of travelers. An important character for the continuation of the myth played here an essential role: Pierre d' Ailly.

Pierre d'Ailly(1351-1420) was a man of the cloth, and a cardinal to boot He was a great scholar and left more than one hundred and seventy different works, mostly on philosophy and theology. He was also a scientific popularizer: we owe him anImago mundi, written around 1410, which was very successful. It is known that he had a very early knowledge of PtolemyGeography: he was also the author, probably around 1410, of aCompendium cosmographiæ, which was intended to be "an aid to the reading of the Geography[38](#38__Ibid___p__168)". His Image of the World itself, which probably predates the Compendium, is a summary of all the astronomical and geographical knowledge available at the time (he used as essential sources SacroboscoTreatise on the Sphere,Roger BaconOpus majus and theTreatise on the Sphere by the mathematician and philosopher Nicole Oresme-14th century) Reading Ptolemy very closelyorder to confront his own knowledge withGeography, he was the first in the West to examine the question of the projection of the sphere on the flat. In his Imago mundi, he tried to reconcile the vision of the world coming from astronomy (which divided the sphere into "climates") and that of the cosmographers. He thus completed thetraditional astronomical data on theSphere with precise descriptions of the different regions of the globe, and revealed in his Compendium all the interest of Ptolemyfor the calculation of distances and the establishment of exact coordinates of geographical areasis in the cosmographic texts of Aillyparticular in theImago mundi, that Columbusfound the various evaluations of the size of the Earth which he used to underestimate the length of the way towards the West Indies

## Medieval maps

We have reported one of the very first maps of the world in OT (orbis terrarum) in the Etymologies of Isidore of Seville, reproduced in a manuscript of the tenth century[39](#39__Cote___BNF_latin_10293__fol) (see p. 96). According to Christiane Deluz, the oldest of these maps dates back to the beginning of thefifth century and is found in the Histories against the Pagans by Orose[40](#40__Deluz__2013__p__18) They represented the inhabited world (orbis terrarum translates the Greek oikoumenê). In these OT maps (also noted T-O), the oikoumenum is represented in the shape of an O, oriented towards the east, surrounded by the ocean which is considered impassable; the latter is sometimes completed by the twelve main winds. The world is divided by a T, showing three zones, each dedicated to one of the three sons of Noah: Asia (Shem) above the bar of the T, Africa (Ham) below on the right, and Europe (Japheth) on the left. The T itself symbolizes the natural separations of these areas, which are generally assimilated to the Pont-Euxin orthe river Tanais (the Don) for the left horizontal bar, to the Nile or the Red Sea for the right part, and to the Mediterranean for the vertical bar The intersection between the two bars of the T, in the center of the map, often represents Jerusalem. Sometimes the holy city is placed at the "apex" of the circle, just below the golden tent of Paradise, which is oriented towards the Levant. This type of representation has lasted for centuries.

In medieval manuscripts, there are many variants of these OT maps, some of which include a lot of geographical data, such as the Ebstorf world map from 1239, where Christ embraces the three parts of the world in his arms and where the most famous rivers and cities are mentioned[41](#41__Voir_la_numerisation_de_cett). The function of this type of map is not - or not only - geographical, but cosmographic and theological, even contemplative. Geography does not exist as such; it is associated with other disciplines such as astronomy and mathematics, or it is part of an encyclopedic knowledge of the peoples and places of the world.

Very often, following Isidore, the description of the system of the world, of the shape of the Earth and of the oecumene is accompanied by maps, as in a manuscript dated from the XIIth century of the Imago mundi of HonoriusAugustodunensis[42](#42__Manuscrit_conserve_a_Cambrid)mentionedabove.These maps are sometimes accompanied by representations of the five zones described by Macrobius, which were later increased to seven when the first translations of Arabic astronomical treatises were made into Latin

The circular representation is not the only one used. In a manuscript probably dating from the eleventh century and preserved in the British Library, we find a rectangular map representing the inhabited world (the East always at the top of the page). This digitized manuscript can be found online[43](#43__Manuscrit_conserve_a_la_Brit). The map mentions many geographical features (seas, cities, mountains, rivers) and is particularly detailed for the British Isles. It is also curiously squared in its central part but it seems that these lines indicate the limits of the Roman provinces[44](#44__Deluz__2013__p__33).

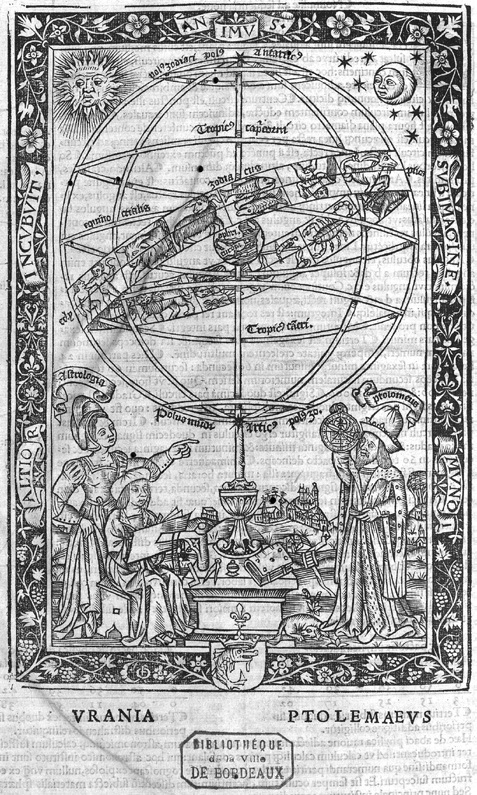
Emmanuelle Vagnon, in an article dedicated to the status of geography in the Latin West[45](#45__Vagnon__2012), evokes the conception of Huguesde Saint-Victor († 1141), philosopher, theologian and teacher at the abbey of the same name. His teaching gave a great place to the commentary of a map of the world which was exposed in the abbey; he consigned its contents in hisDescriptio mappe mundi, of which P. GautierDalché published the Latin text[46](#46__Gautier_Dalche__1988). Huguesde Saint-Victor wrote in the prologue of theDescriptio that he wished to show to those who could not go around the orb "theimages of things". After having specified the interest of the use of varied colors and written legends without which "the images of unknown realities cannot at all be understood", he adds that to make the description of the world does not consist in showing "the realities", nor even "the representations of the realities", but "the meanings".[47](#47__Ibid___p__72_73). In other words, the map must be commented on in order to give meaning to its elements. There is therefore no confusion between the real space and the drawing of the map (however naive it may appear to today's readers). The latter is only a "mediation from which the master's commentary can be deployed[48](#48__Vagnon__2012__p__349)".

At the beginning of the 16th century, a new representation of the Earth as a terrestrial globe (the terraced globe) developed, breaking with the previous centuries. Geography separated itself from astronomy, as Jean-Marc Besse: "Thesixteenth century saw the appearance and fixation of a specific and unified geographical conception of the Earth" whereas until then several "heterogeneous concepts belonging to distinct types of discourse (physics, astronomy, cosmography, but also theology)" coexisted.[49](#49__Besse__2003__p__18). Cosmographies, such as that of Apian, which we are going to explore, all show a spherical Earth, on which one can trace the circles of longitudes and latitudes, and thus produce a grid that allows one to find one's way around when sailing on the ocean, and to project reliable maps

In an article analyzing the place of these maps and their descriptions in the culture of theMiddle Ages, P. GautierDalché evokes the words of the English historian John Rowswho declared, towards the end of the15th century, in his Historia Regum Angliæ "that all urban and rural churches possessed a mappa mundi.P. GautierDalché comments: "This was undoubtedly an exaggeration; but this very exaggeration attests that the Middle Ages knew a true and complex cartographic culture[50](#50__Gautier_Dalche__2016__p__86)".

# III. KNOWLEDGE OF THE SPHERE IN THE AGE OF COLUMBUS, COPERNICUS AND GALILEO

All of this data shows that there was no need to wait for Columbusor Copernicus, and even less for Galileo, to "discover" that the Earth was round, since all traditions converged.If the termsphere designates first of all the structure of the cosmos as a whole, there is no doubt that it also applies to the Earth which occupies the center of this celestial sphere. The Earth was round, well round and always round, whether one examines it according to the tradition of the philosophers of nature, as an elementary mass sitting, immobile, at the center of the world, according to the mathematical tradition of the astronomers, as a sphere surrounded by the planetary spheres and traversed by the large circles which make it possible to cut it out, or according to the tradition of the geographers and that of the navigators, who know better and better the real cartography of the inhabited zones.When one encounters discussions about its sphericity, they do not concern a hesitation with another form: they concern the fact of knowing if one can say theEarth is spherical in spite of the irregularities of the relief or with regard to the question of the decentering or the mode of conglobation of the spheres of the earth and the water



On the eve of the first voyages to what was soon to be called America, there was no reason for the University to suddenly forget a well-established ancient and medieval knowledge. On the contrary, the end of the 15th century, which renewed the teaching of astronomy and saw its massive diffusion thanks to the new printing press, only reinforced, in the readership and probably a little beyond, a well shared knowledge. A simple glance at the numerous illustrations contained in the works of astronomy and cosmography that printing multiplied from the end of the 15th century is enough to convince oneself of this: one crosses armillary spheres and terrestrial globes, carefully squared by the circles of the celestial sphere or by the lines of longitude and latitude[51](#51__Ici__une_illustration_d_une). In anycase, knowledge did not become sclerotic, Arab knowledge irrigated Western astronomy, and in the15th century, an additional sphere was added to the celestial system already constructed, in order to explain the movement known as the precession of the equinoxes, while the arrival in the West of PtolemyGeography allowed for the refinement and modification of cartographic practices

An objection sometimes made to the knowledge of sphericity is that of the compartmentalization of knowledge: sphericity would have been admitted only by a very small number of scholars and would not have been part of a shared, even popular culture. However, this is far from being the case, and we would like to give here some additional proof, to allow the "volunteer reader", as a Renaissance pedagogue would have said, to go and discover for himself what a physician, a literate craftsman, an engineer, a scholar, a court official, a poet or a navigator of the Renaissance could read.

## Official teaching and its dissemination

Insofar as, as John of Sacrobosco, sphericity was a matter heard in and out of the universities (otherwise controlled by the Church and then the Churches and always under the eye of the secular authorities), there was no objective reason for this knowledge to mark time in thefifteenth and sixteenth centuries. On the contrary, the vitality and wide dissemination of knowledge about the terrestrial sphere at the dawn of the 16th century and throughout the century attest that sphericity was a well-known matter, and by no means a recent discovery.

A new synthesis of Ptolemaic astronomy, completed and corrected, was given, first in manuscript form in 1454, then in printed form in 1472, by the astronomer Georg Peurbach(who taught in Vienna), with hisTheoricæ novæ planetarum, written to replace the old Theorica planetarum attributed to Gerardof Cremona. The work, which served as a foundation for astronomical knowledge in the various universities and was an important publishing success, exposes and explains the details of the (more or less) circular motion of the planets around the Earth, using the complex theories of epicycles. Michela Malpangotto, who is a specialist in this field, describes this complex object well and allows us to situate it in the order of astronomical knowledge:

The knowledge of the Almagest that, according to the testimony of Johannes Regiomontanus(1436-1476), his master knew "by heart", as well as the requirement of mathematical rigor that one finds in his activity according to its most different expressions - observation of the sky, calculation of astronomical tables, manufacture of instruments -, are joined in hisTheoricæ novæ planetarum. These offer a coherent and well-structured presentation of the whole Universe in all its parts and according to the composition of their movements from the sphere of the Moon to the First Mobile, "by skilfully reconciling physics with astronomy". The completeness and the underlying scientific foundation allow Peurbachmark a considerable progress with respect to the previous tradition of theTheorica planetarum communis without, however, presenting the difficulties, too high for university students, that the Almageste or itsEpitoma written by Peurbachand Regiomontanus themselves[52](#52__Malpangotto__2012__p__341).

Peurbachthus reminds us that mathematical astronomy was then both concerned with observations and perfectly aware of ancient Greek astronomy and Arab advances However, the sphericity of the Earth is self-evident: the work deals with the heavens, and not with the terrestrial globe, but it shows on each page the planets revolving around the latter.

It was quickly adapted (rather than translated) into French by Oronce Finé, under the titleLa Theorique des cielz, mouvements, et termes practiques des sept planetes, nouvellement et tresclerement redigée en langaige françois (1528), a sign of the wide diffusion of university astronomy. Oronce Finé, mathematician charged by François I, at the Collège royal, to popularize and spread astronomical knowledge, takes great care to remind his readers of the bases of cosmological knowledge. He repeats, at the beginning of his text, that there are two great "regions" in the world, the celestial one, the one that begins at the orb of the Moon, which he calls "the machine of mobile skies [...] whose movement is known and discerned by the stars[53](#53__Fine__La_Theorique_des_cielz)", and the elemental region :

Secondly, it should be noted that the order, situation and figure of the four elements named above is as follows. The Earth is in the middle of the whole world, as the universal center of it.About and outside the said Earth is Water, written in lessquantity, and more constrained than its natural disposition requires: and this for the uncovering of the external parts of the Earth, necessary for the habitation and life of the living: so that Water and the said uncovered parts of the Earth, make one same superfice outside: tending in all places as one same body to rotundity The air surrounds and circulates roundly the said exterior surface of the Water and the uncovered Earth[54](#54__Ibid___f__4_vo_5_ro).

In other words, the Earth and water form a single globe, with the water distributed in such a way as to leave vast areas of land uncovered. The book then details the complicated celestial motions of each planet: the important thing for us here is that the "rotundity" of the Earth is recalled as a preliminary evidence.

Finé, moreover, was also one of the many editors ofSacroboscoSphere, read far beyond academic circles. He borrowed his model from the English monk to write his ownSphere, first in Latin, then in French, in which he brought in particular a new and recent hydrographic and cartographic knowledge.

The knowledge of the Earth's sphericity, therefore, is not technical or rare and is not the prerogative of scholars. Astronomy being a science particularly appreciated by the Renaissance readers, it is well known in the vernacular languages, which can be observed without difficulty in France or in Italy. Knowing that the Earth is round can be considered as a basic level of knowledge, even if the mostpedagogicalworksstill take the time to remind the obviousThe texts are unambiguous: we have quotedFiné'sLes Théoriques, but we can just as easily refer to what he says in hisSphère française of 1551 :

which earth, as the heaviest and hardest element, is gathered and conglobated in the middle of the whole world, making the center of it. And it should be noted, that water does not surround the whole earth in a round and complete way, but is spread by various arms, and lines, and conduits (which we call seas), both within and around it. For it was necessary that some parts of the said earth should be uncovered, for the salvation and habitation of the living: as it pleased the Creator, foreseeing the convenience of all things[55](#55__Fine__La_Sphere_du_monde__f).

The conglobation of earth and water is a sign of divine foresight because, for a man of the 16th century, there is no incompatibility between cosmological-astronomical teaching and that of faith.Oronce Finé, as a good pedagogue, reminds us a few lines further on that this Earth is immobile (this allows us to observe the celestial movements: without terrestrial immobility, we would not see the heavens turn), and that it is at the center of the world, like a tiny point in the cosmos

If one goes through the French astronomical literature of the Renaissance (or the Latin one as well), one does not encounter anything else. The mathematicians of the Pléiade also took up the subject, and one can read, for example, in the Institutions astronomiques of Jean-Pierre de Mesmes, published in 1551 and whichconstitute a form of popularization of astronomical knowledge, a chapter entitled "Que la Terre est ronde" (That the Earth is round[56](#56__De_Mesmes__Institutions_astr). Jean-Pierre de Mesmes, as a fine scholar, evokes there the pre-Socratic "reveries":

It does not retain the shape of a tambourine according to Leucippus, nor of a boat according to Heraclitus, nor of a column according to Anaximander, nor of a canal according to Democritus, nor of a platform according to Empedocles, nor of a pyramid according to other dreamers: but a round and spherical shape

A demonstration by the absurd follows:

But if the Earth were fluted, or hollowed out in the manner of a boat, all the stars would appear earlier to Westerners than to Easterners. If it were flat and plain, those of the Levant and Ponant would see all the celestial bodies rise and set at the same time. If it were columnar or in the shape of a column [...] those who would be around the column would not be able to see a single star, which would be totally example of the rising and setting [etc.].[57](#57__Ibid___p__54).

It should be noted here that the idea of a flat Earth seems as fanciful as that of a pyramidal, columnar or boat-shaped Earth, ideas that are explicitly pagan and pre-aristotelian at the same time. On the other hand, the data of the experiment, precisely, are capital:

For those who sail in the open sea can see nothing but the sky and the sea: but as they approach the roadstead, they gradually begin to see the tops of the mountains and towers, as if they were rising out of the water[58](#58__Ibid___p__55).

And to conclude, after having invoked the experience of the navigators as the argument of the shadow of the terrestrial globe during the eclipses:

It is therefore necessary to stop that the terrestrial mass is round, since its shadow is round: what the Holy Prophets confess, calling the Earth in hands Orbis terræ. Of advantage reason wants well, that the creature holds something of its Creator: because just as the Creator is eternal, exempt from beginning and end, and infinite in its size, to the similar is possible to assign neither end nor beginning to the round figure[59](#59__Ibid).

The Cosmography of Pierre Apian, a very successful book in Latin as in the French version attributed to GemmaFrisius, is another trace of the common and widespread character of the certainty of sphericity. In hisCosmography (Liber cosmographicus, 1524), reprinted many times, enlarged and illustrated in the edition given by the mathematician and maker of material globes GemmaFrisius, Apian already engaged in a demonstration by the absurd, imagining what an eclipse would produce if the Earth were square or triangular. The text, here again, is explicit:



Because the superficies or body of the Earth and the water is round, as it appears evidently in the eclipse of the Moon (because their shadow is similar to a dark and thick round body) and is established or constituted without any movement in the middle of the world, it has in its environment five circles, if as has the sphere in its convexity, namely the equinoctial, the two tropics, and the Arctic and Antarctic circles[60](#60__Apian__Cosmographie__trad__G).

His numerous and precise illustrations also bear witness to this.

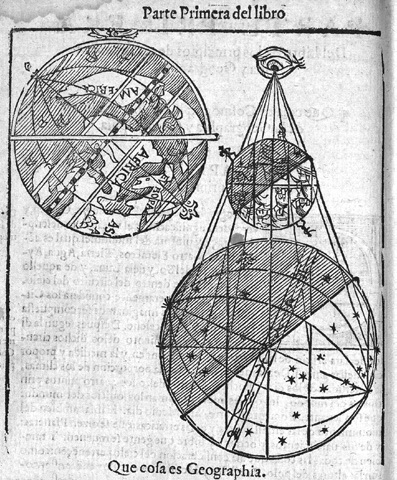
Finally, let us point out, at the very end of the century, the existence of a small private work of scientific education, written by a pedagogue father for his children, in which a little boy and a little girl dialogue. In this Globe of the World with a transparent title, written by Simon Girault, little Charles answers questions from little Marguerite.He explains to her that the Earth is at the center of the world and that if one pierced a hole through it and threw a piece of lead into it, "it would never stop in the middle of the Earth and would remain assuspended[61](#61__Girault__Globe_du_monde__f)". Marguerite, who is looking at the illustrations in a book she is reading with her brother, who is more educated, observes that the sky surrounds the Earth on all sides. Charles confirmed that she had understood correctly:

In any place of the Earth that we can be, we always find ourselves straight and plumb, and we marvel at how our antipodes, who walk with their feet opposite to ours, can climb against the Earth: they would be astonished in the same way to see us holding the bottom having our feet against them: in short, each one is planted straight on the Earth.

Soon after, Marguerite asks, "How can we know that the Earth is a globe?" :

Charles: It is proved by several demonstrations, even by the reason above that the Sun and other stars rise and set earlier to the Orientals, than to those on the Western side, which would not happen if the Earth were flat as it seems to us. [...]. The roundness is also proved by the Eclipse of the Moon: and it is necessary to note that the lunar globe is like a mirror which cannot shine if it is not exposed to some light: or the light which makes the Moon light up are the rays of the Sun, as we see in the following figure: which also shows us that the Earth being diametrically interposed between the Sun and the Moon, [...] prevents that the rays of the Sun do not reach the lunar body. [...] Now this shadow appears round when entering and leaving the body of the moon, which gives us certain argument that the Earth is round, since the shadow is such[62](#62__Ibid___f__5_ro_vo).

If mathematicians and professional astronomers do not often take the trouble to demonstrate the roundness of the Earth, which is self-evident and of which they do not care much since they scrutinize the skies, cosmographers, who look at the Earth and are becoming geographers[63](#63__Passage_de_la_cosmographie_a)The cosmographers, who look at the Earth and are becoming geographers, the popularizers and the pedagogues take care to establish that the Earth is round, and to base their arguments on "reason" and "experience", while not failing to point out, for some, that this welcome sphericity is the result of divine wisdom.



One could thus multiply the examples. The evocation of the cosmos, of the starry spheres and the terrestrial globe is explicitly found in literature, in the authors of philosophical poetry, of course, who often give a precise account of the knowledge of their time or at least allude to it as a shared background, but also in forms of literature unrelated to the subject. The first case also illustrates how the supposedly antinomic relationship between faith and science could be perceived by the worldly readership. In La Sepmaine de Du Bartasa cosmological poem that was a huge bestseller at the end of the16th century(first published in 1578), Guillaume Du Bartas, a convinced Protestant poet, recounts the creation of the world by God in a long poem that follows the structure of the first verses of Genesis. He infuses it with a great deal of contemporary scientific knowledge, showing precisely how the biblical framework can be reconciled with scientific knowledge, which he does not see as contradictory. In the "Third Day", the one that exposes the separation of earth and water, the poet first takes up the traditional elements of the sphericity of the globe formed by earth and water, to conclude:

This itself is enough to show that from the wave

And from the dry element the mass is all round.

That it is only an egg, which as made to the turn,

Sees the day and the night go together by turn.

Even when a Vespuce, a Columbus, a Marc Pole

And other Typhis centers would have no other pole

Drives the Arctic pole, and lives on the waters,

Found under our feet so many new worlds,

No, they would never have lost the Tramontane

To see the other pivot, if the Ocean Sea,

To make a complete globe with his sister,

From all and any place did not bend his mood [i.e.: water].[64](#64__Du_Bartas__La_Sepmaine__III).

The scientific demonstration, supported by the experience of the navigators (the poet underlines that it did nothing but confirm a known thing, notable point when one is interested in the diffusion of the knowledge in the not specialized readership), leads him straight to the divine praise:

O great God! It is your hand, it is undoubtedly your hand

Which serves as a pillar of the human home.

For although it hangs in the air, although it swims on the wave

Although from all sides his figure is round,

That everything revolves around it, and that its foundations

Be constantly agitated by rough movements:

He stands still, so that on his face

May Adam's holy race live in peace[65](#65__Ibid___III__v__391_3988__p).

As we can see here, sphericity poses no problem for the Protestant poet. Nowhere does it appear in contradiction with the biblical teaching (Du Bartasis moreover clearly inspired by patristics, in particular by theHexameron of Basilof Caesarea). On the other hand, the perfect stability of this terrestrial globe, suspended in the middle of a world whose heavens move, which is surrounded by an air agitated by winds and storms and whose entrails are constantly threatened by earthquakes, is an object of wonder and praise.

As for the banality of the knowledge of the sphericity in the world of the lisants-writers (at least), we will give a typical example. In Hippolytus, a tragedy by Robert Garnier(1573) inspired by Euripidesand Senecaand recounting the incestuous love of Phaedra for Hippolytus, a literary subject and genre totally unrelated to the scientific question, we find, in the course of the verses, significant allusions. The Nurse, evoking the voyages of Theseus, says thus that " Theseus, who, companion of the great Tirynthien / Has almost all run this earthly globe[66](#66__Garnier__Hippolyte__v__561_5)"; further on, it is a Hippolytus frightened by Phaedra's confession whocries out: " No, the great Ocean, with all the waves / With which it washes by floating this great round mass / Could not wash me[67](#67__Ibid___v__1489_91__p__140_1)", and finally Theseus, believing his son guilty, announces that he will not escape the punishment: " Or run where you will, through vagabond / The lands and the seas of this great round world[68](#68__Ibid___v__1803_4__p__157). " The "earth globe" is, as we can see, a commonplace.

The question of the Earth's motion, on the other hand, whether it be its revolution around the Sun or its rotation on itself, is one of the crucial points explaining the clear tensions between science and theology that arose in the 17th century. To focus here again only on what a literate but non-specialist public could know and think, let us point out that Du Bartasmeticulously commented on by Simon Goulart, a Protestant pastor, scholar and polygrapher, a commentary that was constantly enriched over the years at the end of the16th century. In the entry "Earth" of his annotations, he writes:

The poet first says that the earth, as the heaviest of the four elements, holds the center and middle of the world, being supported by the secret power of God, and surrounded by the element of water, with which it makes a globe, surrounded by the regions of the air, the air of elemental fire. [...] And then he shows that it remains firm in its being (Psalm 104) to serve as a home for man and animals[69](#69__La_Sepmaine_ou_Creation_du_m).

clear here to what extent sphericity is not a problem, even if the "secret power of God"is mentioned instead of the laws of Aristotelian physics, which it replaces without difficulty But we also understand that the question of motion is another matter for Christians, Catholic or Reformed:

The Earth, ordained as the home of the human race and especially of the Church gathered from it, and sanctified to God, necessarily required that the hand of God, which sustains all things powerfully, should give firm and fixed abode to its hosts. [...] It was also necessary that the dwelling place of the human race and of the Church militant should not be shaken at all: but that among the revolutions of the water and the air, there should be some firm foundation for the inhabitants whom it lodges and feeds[70](#70__Ibid___p__384_385).

The problem, later confirmed by the trial of Galileo, is not sphericity, but rather the question of the place of the Earth (depriving it of its place at the center of the world constitutes a double theological and anthropological revolution) and of its movement Here, as we can see, the obstacle is indeed theological and not scientific, but an effort of intellectual disorientation also allows us to understand why, for sincere Christians, the question of movement could be such an issue.

## The reality of the debates

intention to repeat here the history of Renaissance astronomy, which has been well studied elsewhere. Let us simply remind the curious reader of the (very) broad outlines of what is meant by the notion of a"Copernican revolution", an expression that has become commonplace to designate any major change in scientific or even cultural paradigm

The end of the fifteenth and sixteenth centuries were undoubtedly periods of intellectual and scientific ferment.The posthumous glory of Copernicusobscures other names, such as GirolamoFracastoro or Tycho Brahe, whose astronomical proposals were not necessarily confirmed, which is why a positivist history of science has long neglected themother hand, they show that astronomyintensely active from the end of the15th century onwardsmany different ways, of which the heliocentric hypothesis is only one of the translations, even if it is the most important.

One must therefore be attentive to several points: the astronomical revolution of the sixteenth century cannot be read in the mode of "one scientist alone against all", nor in the mode of "science against the Church" - a myth constructed by positivist history on the basis of the trials of Galileo- and even less in the providential mode of the great man and the scientist-genius-who-discovered-modernity. Moreover, one should not confuse the return to Greek sources restored in their integrity with the rediscovery of theories. If a scholar like the Viennese astronomer Georg Peurbach(† 1461) returns to a direct and authentic contact with theAlmagest, for example, this does not mean that Ptolemaic theories were unknown, as we have shown.Beyond the myth of the flat Earth, it is very striking for us teachers to discover that undergraduate students of literature or philosophy seem to fall head over heels when we explain to them that all medievalis based on commentary on the works of Aristotleand that the texts of Plinyor Ovidwere bestsellers, if one may say so, of the Middle Ages

The transformations that occurred between 1450 and 1650 were many and varied. They concern astronomy but also physics: the heliocentric hypothesis and the double earth revolution, but also, and this is just as important if not more so, the questioning of the Aristotelian bipartition between the elementary sublunary universe and the quintessential supralunary world, discussions on the existence of the void, on the possibility or not of an infinite and open universe, on the very existence of other worlds (another continent and new men have indeed been found!) The humanist effort to return to the sources was thus combined with the quest for efficient mathematical and physical laws, capable of accounting for phenomena without falling into the terrible complexity of the astronomical system as it had become in the 16th century, and with the rise in power of observation. Contrary to legend, the Church encouraged the scientific movement, at least to a certain extent and for a certain time. The relationship between philosophy and religion is an eminently complex question, and the real tension comes later, in the 17th century. First of all, scholars did not consider scientific curiosity as incompatible with faith, and it is enough to look at the number of scientific works dedicated to churchmen and allowed by their patronage, to measure to what extent the idea of a Church against science is false: Laurent Pinon, who has very precisely studied the production of scientific books in Rome between 1527 and 1650, has clearly shown that pontifical and ecclesiastical patronage was in the majority and that, even if it is necessary to measurewith finesse the complexity of the issues at stake, "it is clear that we are far from the caricatural opposition that has sometimes been drawn up between science and the church[71](#71__Pinon__2009__p__201)". Let us simply recall what Alexandre Koyré wrote several decades agoabout Copernicusin the volume devoted toModern Science by René Taton:

Neither the pope nor anyone else in Rome raised objections to either the theory or its author. three years later (in 1536), one of the members of the Roman curia, the cardinal archbishop of Capua, Nicolas Schönberg, invited Copernicusto publish his discoveries and asked him to have a copy of his work made at his own expense[72](#72__Taton__1995__p__61).

On the other hand, one should obviously not minimize the theological problems and thus the growing opposition that the new system of the World gradually aroused. Here again, however, it is better to start from the postulate of the intelligence of the intellectuals of the time, including churchmen, rather than from their supposed stupidity coupled with an ignorance that was at best dusty: in a profoundly Christian society, catholic as well as reformed, how not to understand that the decentering of the Earth, the hypothesis of other worlds or of an infinite universe, the discovery even of the American peoples of whom one wonders what is their place in the Christian history (are they indeed the children of Adam, did they know the Revelation?) can give rise to discussion and opposition? As in allcircles, one should not put everyone in the same basket: certain ecclesiastics of thesixteenth and seventeenth centuries were remarkably curious and cultured, while others appeared more narrow-minded, even totally closed to any scientific development and perfectly obtuse.

In any case, our purpose here being neither to defend nor to condemn the Church, it is when modernity is well underway, that is, neither in the Middle Ages nor in the Renaissance, that the tensions between science and religion become tense, to the point of becoming an open battle. It was in modern Europe, and not in the Middle Ages, that "witches" were burned. was not a medieval-type Church that condemned Galileoand the Copernican theses, but precisely the Church of the early17th century, that of the age of Descartes, using a new literalist vision of the Scriptures. This at least makes it possible to question the terrible label "medieval" with which, unfortunately, the word "obscurantism" is still sometimes associated.

time of Galileoand his trial in the early17th century, sphericity had long been accepted and transmitted by all learned authorities without opposition from the Church. It was well established in the wider culture of the reading-writing community and in the circles that were able, by porosity, to benefit from this knowledge. To associate Galileo with sphericity, as is still commonly done today, cannot even be excused by making Galileo a kind of revelator who allowed theories that had been kept under wraps to be revealed. We cannot enter here into the very complex details of Galileo's trial; it continues togive rise to important work and its interpretation is far from being settledAbove all, we wish to emphasize, as Francesco Berettain 2005, that it is still not so easy "to lay the groundwork for a true historicization of the Galileo.Contrary to what one might think, it is still largely unproduced, due to the influence still exerted by the myth of the "scholar persecuted by the Church", produced in thenineteenth century during the secularization of European societies[73](#73__Beretta__2005__p__521)".

Notes

[1](#1_3). Brown, 2011, p. 72

[2](#2_3). For an example illustrating the complexity of the circulation of texts, see GautierDalché, 2009

[3](#3_3). Boulnois, 1998, p. 213

[4](#4_3). Boethius,Consolation of Philosophy, II, 13.

[5](#5_3). Bede,De natura rerum, XLVI, trans.GautierDalché, 2013, p. 173

[6](#6_3). Mayaud, 2005, vol. I, p. 91.

[7](#7_2). PL 90, col. 456-457.

[8](#8_2). Bede,Tabernacle, book II, p. 86-87.

[9](#9_2). Lindberg, 1979.

[10](#10_2). Libera, 2004, pp. 363-370 and Bianchi, 1999

[11](#11_2). Ribémont, 2001.

[12](#12_2). Ducos, 1998.

[13](#13_2). Libera, 1989, p. 4

[14](#14_2). Boulnois, 1998, p. 225

[15](#15_2). Ribémont, 2001.

[16](#16_2). Deluz, Ribémont.

[17](#17_2). Dante,Divine Comedy, "Paradise", 10, v. 130-132.

[18](#18_2). Fontaine, introduction to Isidore,De natura rerum, p. 5.

[19](#19_2). Ibid, p. 6.

[20](#20_2). Isidore, De natura rerum, p. 166.

[21](#21_2). Ibid. , p. 166.

[22](#22_2). Fontaine, 1990.

[23](#23_2). Isidore, De natura rerum, p. 208.

[24](#24_2). Ibid. , p. 212-216.

[25](#25_2). Etimologías, Mapa del Mundo Conocido (source Wikicommons).

[26](#26_2)[. http://uranie.huma-num.fr/](http://uranie.huma-num.fr/)

[27](#27_2). John of Sacrobosco,Sphere, trans.G. Des Bordes, p. 29.

[28](#28_2). Ibid. , p. 32.

[29](#29_2). Ibid. , p. 33.

[30](#30_2). Photo credit: La Sphere de Jean de Sacrobosco, Paris, Hierosme de Marnef et la veufve Guillaume Cavellat, 1584, copy of the B.M. of Bordeaux, document digitized by the Uranie library: http://uranie.huma-num.fr/idurl/1/1479.

[31](#31_2). Photo credits: ibid.

[32](#32_2). Silvi, 2003, p. 346

[33](#33_2). See for the unmodernized text, L'Image du monde, p. 93.

[34](#34_2). Placides and Timeo, § 134, p. 56.

[35](#35_2). Ibid. , § 118, p. 50.

[36](#36_2). GautierDalché, 2009, p. 142

[37](#37_2). Ibid, p. 146.

[38](#38_2). Ibid, p. 168.

[39](#39_2). Call number: BNF latin 10293, fol. 139.

[40](#40_2). Deluz, 2013, p. 18

[41](#41_2). See the digitization of this world map made by the University of Lüneburg: https://warnke.web.leuphana.de/hyperimage/EbsKart/#O9999/

[42](#42_2). Manuscript held at Cambridge, Corpus Christi College Library, ms 066. [https://parker.](https://parker.stanford.edu/parker/catalog/jb848tp9919)stanford.edu/parker/catalog/jb848tp9919, p. 2.

[43](#43_1). Manuscript kept in the British Library, anonymous, call number: Cotton Tiberius, B V/1, <http://www.bl.uk/manuscripts/Viewer.aspx?ref=cotton_ms_tiberius_b_v> !1\_f002r , f. 56v.

[44](#44_1). Deluz, 2013, p. 33

[45](#45_1). Vagnon, 2012.

[46](#46_1). GautierDalché, 1988.

[47](#47_1). Ibid. , p. 72-73.

[48](#48_1). Vagnon, 2012, p. 349

[49](#49_1). Besse, 2003, p. 18

[50](#50_1). GautierDalché, 2016, p. 86

[51](#51_1). Here, an illustration from an edition of the Sphere, showing John of Sacroboscohimself, the muse Urania and Ptolemy,Textus de sphaera Joannis de Sacrobosco, Paris, Simon de Coline, 1527. Photo credit: Urania Library,http://uranie.huma-num.fr/idurl/1/1511.

[52](#52_1). Malpangotto, 2012, p. 341

[53](#53_1). Finé,La Theorique des cielz, ed. 1607, f. 4 vo.

[54](#54_1). Ibid, f. 4 vo-5 ro.

[55](#55_1). Finé,The Sphere of the World, f. 2 vo.

[56](#56_1). De Mesmes,Institutions astronomiques, chap. 18, p. 54-56.

[57](#57_1). Ibid, p. 54.

[58](#58_1). Ibid, p. 55.

[59](#59_1). Ibid.

[60](#60_1). Apian,Cosmography, trans.GemmaFrisius, p. 7Photo credit:La Cosmographia de Pedro Apiano, corregida y anadida por Gemma Frisio, Antwerp, Juan Bellero, 1575, document digitized by the Uranie Library: http://uranie.huma-num.fr/idurl/1/1435.

[61](#61_1). Girault,Globe du monde, f. 4 ro.

[62](#62_1). Ibid, f. 5 ro-vo.

[63](#63_1). Passage from cosmography to geography. Photo credit: La Cosmographia de Pedro Apiano, corregida y anadida por Gemma Frisio, Antwerp, Juan Bellero, 1575, document digitized by the Uranie Library: http://uranie.huma-num.fr/idurl/1/1435.

[64](#64_1). Du Bartas,La Sepmaine, III, v. 365-376, p. 186.

[65](#65_1). Ibid. III, v. 391-3988, p. 187.

[66](#66_1). Garnier,Hippolyte, v. 561-562, p. 98.

[67](#67_1). Ibid, v. 1489-91, p. 140-1.

[68](#68). Ibid, v. 1803-4, p. 157.

[69](#69). La Sepmaine ou Creation du monde, t. 2, L'Indice de Simon Goulart, p. 382.

[70](#70). Ibid. at 384-385.

[71](#71). Pinon, 2009, p. 201

[72](#72). Taton, 1995, p. 61

[73](#73). Beretta, 2005, p. 521

SECOND PART

History and stakes of a myth

CHAPTER I

The invention of the flat Earth

It is mainly in the nineteenth century that the idea of a belief of the men of the Middle Ages in a flat Earth became widespread and strongly rooted. The legend, however, is older and appears timidly in the seventeenth and especially in the eighteenth century, especially with Voltaire.The elaboration of the myth was then progressively consolidated within two other fabulous constructions, in the light of which it must be examined: the heroisation of the figures of Galileoand Christopher Columbusand, more generally, of discoverers or scientists supposed to have given back to the Earth the sphericity that the Church had denied it for nearly a thousand years If these two constructions use a common argument, "in the Middle Ages it was believed that the Earth was flat," they do not have quite the same function. Galileo is the figurehead used by both Protestants and now secularized science to support the idea of a "papist" Catholic Church that was opposed to progress from its birth, an argument that was used, for example, at the time of the Darwinism quarrel, Columbuswas used above allto present the triumph of knowledge acquired through experience and trial and error against dogmatic theories, or as the figure of the humble navigator guided by divine providence, which explains why Columbus wasmagnified by Catholics

# I. FROM THE ANTIPODES TO THE FLAT EARTH

The exhumation of Lactantius

The construction of the myth of a medieval belief in a flat Earth was indeed done by small touches and by the skilful association of real facts (transatlantic voyages, heliocentric hypotheses) and equally real debates (the existence of inhabitants of the antipodes), with a belief, that of the flat form, perfectly marginal even within the Christian Church. As P. GautierDalché, who is intrigued by the persistence of this mythrightly points out, the argument of the flat Earth was never invoked by the humanists.They did not, however, shy away from decrying and ridiculing the Middle Ages and were thus the inventors of the medieval "darkness", of which Rabelaisand his famous letter from Gargantua to his son Pantagruel, which appears in all literature and history textbooks on the Renaissance, did not do little to implant the idea firmly in French minds

The perfect knowledge that the men of the Renaissance had of the academic knowledge of their time made it impossible to use, even in very bad faith, such an argument, which would have appeared as perfectly ridiculous, as thelong success of theSphere of Sacroboscoshows. Thus, "within the framework of the quarrels born about the heliocentric theories of the universe, only is sometimes mentioned the negation of the antipodes by some theologians, but it is rarely associated with a debate on the shape of the Earth[1](#1__Gautier_Dalche__2013__p__168)". On the other hand, the unfortunate Lactantiushas, for a long time, served as a typical example, not of the ignorance attributed to the Church, but of the risk involved in judging what one does not know Copernicushimself unwittingly set a dangerous precedent: he invoked Lactantius in the dedication of theRevolutions of the Celestial Orbs to Pope Paul III:

For it is well known that Lactantius, an otherwise famous writer, but a weak mathematician, spoke in a perfectly childish way about the shape of the Earth, making fun of those who discovered that the Earth had the shape of a sphere The learned will not be surprised, therefore, if such people mocked us. Mathematical things are written for mathematicians, to whom, if I am not mistaken, these works of mine will appear to contribute to the glory of the Ecclesiastical Republic whose principality Your Holiness occupies today[2](#2__Copernic__Des_revolutions_des).

is obviously no question of ridiculing the Church in a dedication to the Pope, but it is not uninteresting that Lactantiusappear in this context: Copernicusshows that Lactantius's words had precisely no authority and served to illustrate the incompetence of the non-specialist who meddleseverything, rather than the opinion of religious authorities Lactantius appears here as the only known defender of the "childish" belief in the flat earth.

An equivalent testimony, and in French, is found a few years later by La Popelinière- a Protestant scholar - in a work related to geography, published in 1582:

For the theologians who, throwing themselves out of their professions, have wanted to discuss such things, have, in the opinion of some, been very heavily misled, Saint Augustinein particular, Lactantiusand several others [...]. Several ancients [...] thought it round, and that there were antichoric peoples. Platoeven confessed the Antipodes.But they did not leave us the demonstrations, which was occasion to Saint Augustineto believe well the roundness of the ground, but to deny that there were Antipodes under us: estimating that water covered all the lower part of the ground which did not appear to us[3](#3__Les_Trois_Mondes_de_La_Popeli).

The controversy over the antipodes took another turn in the 17th century, when it involved papal authority. In 1554, the humanist scholar and educator Johann Turmair (known as John Aventin or Johannes Aventinus) summarized in hisAnnales Boiorum (Annals of Bavaria), an epistolary exchange that took place in the eighth century between Pope Zechariah(741-752) and St. Boniface, a missionary commissioned by the pontiff, concerning a defense of the antipodes put forward by an apparently educated Irish monk, Virgilin 748.Virgil († 784) had been called to the continent by Pepinthe Short and then by his brother-in-law Odilon, Duke of BavariaThis episode has givenrise to different interpretations.Pierre-Noël Mayaudbelieves that Pope Zachariascondemned the priest's remarks because the latter had defended the possible existence of antipodians, whereas the pontiff had denied it, following the example of Augustine[4](#4__Mayaud__2005__t__I__p__91_121). Patrick GautierDalché considers that if there was indeed an exchange of letters between Zechariahand Boniface, it was to discuss the advisability of condemning Virgil because he had supported, not the existence of antipodians, but apparently that of another world[5](#5__Gautier_Dalche__1988__2013).

The pope advised that a council be held if it could be proved that Virgilhad indeed said what he was supposed to have said, that is, "that there is another world and other men under the earth, as well as a sun and a moonThe affair has nothing to do with a quarrel about sphericity, and Virgil was not condemned for heresy; he became bishop of Salzburg and was canonized in the13th century. GautierDalché explains, like Mayaud, how this text was taken out of its context and instrumentalized, especially from theseventeenth century on, when one wanted to construct "from the very uncertain bases that it provides, a case of persecution similar to that of Galileo" since "the belief in the existence of the antipodes would have been condemned as heretical"[6](#6__Gautier_Dalche__2013__p__196).

That the exhumation of the Virgilwas then perceived or subsequently became an issue in the quarrel between the Churches as well as between science and the Catholic Church is evident in the19th century. Migne(Abbé Migne), director of the immense publication of the Greek and Latin writings of the Fathers of the Church (thePatrologia latina and thePatrologia græca), writes in fact, quoting the text of the letter given above:

And well! On these rather vague clues, a Protestant author has forged a whole story, and French writers have been ill-advised enough to repeat it. [...] In truth, one had to be very preoccupied or tormented by the desire to raise some untoward suspicion against the papacy, to see in the lines of Pope Zachariah, the condemnation of the existence of the antipodes and of the system of the rotundity of the Earth[7](#7__Migne__Troisieme_et_derniere).

Mignethree centuries later, provides two interesting pieces of information: the resumption of the information is interpreted as an anti-papal maneuver and associated with the question of sphericity, which is not the case originallyThe Protestant author referred to here is the poet Thomas Moore(1779-1852), who publishes aHistory of Ireland (The History of Ireland, 1835) in which he reports the episode and comments on it by saying:

the fact was that Virgil, who had pushed his geographical studies very far, had guessed the spherical shape of the Earth, from which he concluded the existence of the antipodes But it was not in these terms that the question was put before the Pope. Virgil was accused of having said: That there existed under our Earth another world populated by men who were not descended from Adam and for whom J.C. had not shed his precious blood[8](#8__The_History_of_Irland__trad).

As for the "French writers", another note specifies that it is Michelet.

repercussions of the Virgilfor thenineteenth century are immediately apparent: it set a happy precedent for the Galileo, rooting the Church's opposition to all forms of scholarly knowledge far into Western history. D'Alembertexample, in the "Preliminary Discourse" of theEncyclopédie, explicitly links the Galileo affair to the Virgil affair, and does not fail to mix Augustineand Christopher Columbusin a joyful but effective jumble:

A tribunal which has become powerful in the south of Europe, in the Indies, in the New World, but which faith does not order to believe, nor charity to approve, or rather which religion reproves, although occupied by its ministers, and whose name France has not yet been able to pronounce without fear, condemned a famous astronomer for having maintained the movement of the Earth, and declared him a heretic; just as Pope Zachariashad condemned a bishop a few centuries before, for not having thought like Saint Augustineabout the antipodes, and for having guessed their existence six hundred years before Christopher Columbusdiscovered them It is thus that the abuse of the spiritual authority joined to the temporal one forced the reason to silence[9](#9__Encyclopedie__tome_I__1751).

This affair became the emblem of the opposition between scientific theses and the word of a Church represented by its first prelate. Demonstrating that the latter had already been stubbornly mistaken in refusing, in the eighth century, that the antipodes were inhabitable allowed the pontifical truth to be put into perspective. A whole tradition ofmilitant historiography has thus been based on the biased use of existing sources, without questioning their relevance, in order to support the idea of a continuous and consubstantial obscurantism in the Church, which was particularly successful in thenineteenth century, for political and religious reasons that are easy to understand, but which cannot be scientifically excused.

The Christian Topography of Cosmaspublished in Greek, accompanied by a Latin translation, in 1707 by Bernard de Montfauconin theCollectio Nova Patrum et Scriptorum Græcorum. However, it was not published under the title Cosmæ Indicopleustæ Topographia, which is often mentioned in bibliographies, but the title page bears Cosmæ Ægyptii monachi Christiana topographia, sive Christianorum opinio de Mundo (or Cosmæ Indicospleustæ Christrianorum opinio de Mundo, sive Topographia Christiana in the summary of the volume), i.e., The Christian Topography of Cosmas, an egyptian monk, or the opinion of the world of Christians. One can easily imagine how this title alone could be used to support the idea that this was the thought of "the" Christians. Montfaucon, in the preface of his edition, writes without malice (he is himself a Benedictine) that the majority of ancient Latin authors were reluctant to accept sphericity[10](#10__Montfaucon__Cosmae_AEgyptii). The authority of the Benedictine accredits the weight of the word of Cosmasand confers to him a range which it had in reality never had

The myth of the flat Earth was probably born little by little from the more or less voluntary confusion between the realto heliocentrism and its cosmological consequences, the affabulations on the representativeness of Cosmasand a detour of the quarrel on the antipodes

## The weight of Voltaire

Voltaireis probably one of those who most clearly contributed to the fame of Lactantius's quotationdenying the antipodes and, thus, the sphericity of the Earth, a fame facilitated by the translation into FrenchInstitutions divines in 1752. For him, it was a question of opposing a naive primitive Christianity to the superstitions and fanaticism that he considered characteristic of the later Church[11](#11__Voir_F__Jacob__2003__p__53). In the case of the question of the antipodes, it is a quotation in charge that he produces in the entry "Material Heaven" of his Philosophical Dictionary (1764):

a curious thing to see with what disdain, with what pity, Lactantiuslooks at all the philosophers who for four hundred years had begun to know the apparent course of the Sun and the planets, the roundness of the Earth, the liquidity, the non-resistance of the heavens, through which the planets ran in their orbits. He looks for "by which degrees the philosophers reached this excess of madness to make of the Earth a ball and to surround this ball with the sky".[12](#12__Voltaire__Dictionnaire_philo).

A note added here by Voltaireafter 1764 ironically states that in 1770, the clergy of France decided "solemnly", "in the eighteenth century", tocite Lactantiusas a Father of the Church, whereas he is only an author "whom the students of the school of Alexandria would have laughed at", if they had deigned to read himHe insists in the next entry, entitled "Heaven of the Ancients," and in turn adds Augustineto the record:

Most nations, with the exception of the Chaldeans, considered the sky to be solid; the fixed and immobile Earth was longer, from East to West, than from South to North, by a large third; hence the expressions of longitude and latitude that we have adopted. We see that in this opinion it was impossible for there to be antipodes. Also Saint Augustinetreats the idea of antipodes as absurdity; and Lactantius, whom we have already quoted, expressly says: "Are there people foolish enough to believe that there are men whose heads are lower than their feet?[13](#13__Ibid___p__278_279).

This presentation of the opinions of Lactantiusand Augustineby Voltaireexplicitly - and perhaps voluntarily - confuses the form that the latter gave to the oecumene and that which they gave to the Earth

Finally, the article "Figure or shape of the Earth" is a kind of vade mecum of the myth of the flat Earth for the use of later generations:

How did Plato, Aristotle, Eratosthenes, Posidoniusand all the geometers of Asia, Egypt, and Greece, having recognized the sphericity of our globe, come to believe for so long that the Earth was longer than a third of its width [...]?The just respect for theBible, which teaches us so many more necessary and sublime truths, was the cause of this universal error among us. TheFathers considered the Earth as a great vessel surrounded by water; the bow was in the east and the stern in the west. We still see in Cosmas, a monk of thefourth century, a kind of geographical map where the earth has this figure. Alonso Tostado, bishop of Avila, at the end of the15th century, declares in his Commentary on Genesis that the Christian faith is shaken if one believes that the Earth is round.Colombo, Vespuce and Magellan, did not fear the excommunication of this learned bishop, and the Earth took again its roundness in spite of him[14](#14__Ibid___p__383_384).

Voltairethus seriously (and durably) establishes the idea that the Fathers of the Church imposed on the whole of Christendom, astronomers included, the doctrine of a flat Earth, and inaugurates the shortcut, which is found in the following century in numerous texts:there were the Psalms, Cosmas, then a jump of ten centuries during which nothing happened, a retarded Church, and finally came those providential men that were the navigators, facing courageously the ecclesiastical imprecations as the dreaded oceanIt is therefore with Columbus, Vespucciand Magellanthat "the Earth regained its roundness", or even, for many of our contemporaries, took it.

Voltaireis not the first to confuse (voluntarily or because of a too quick reading) the position of Lactantiuswith that of Augustine.D'Alembertuses it, as we have seen, and Cyranode Bergerac, inLes États et Empires de la Lune, placed in the mouth of one of his characters these words about Augustine:

This great character, whose genius was enlightened by the Holy Spirit, assures that in his time the Earth was flat as an oven, and that it swam on water like a cut orange[15](#15__Cyrano__Les_Etats_et_Empires).

But it was a fiction, and a dialogue in which the weapons and verve of rhetoric were deployed, bad faith included, as shown by the rather amusing and completely eccentric character of the image. At the same time,inCharles Perraultmade a clear distinction in hisParallèle des Anciens et des Modernes between the fact that Augustine"never doubted that the Earth was round", and therefore that the antipodes existed, and his conviction that these lands could not be populated by men or animals "because of the great spaces of sea which separate them from the place where Adam was created"[16](#16__Perrault__Parallele__p__70).

# II. THE CHURCH VERSUS SCIENCE

The confrontation between religious doctrines and the new system of the world, which was very real at the time of the trial of Galileoin the17th century, became, for a current marked by a militant anticlericalism, a determining prism through which the history of science and, more broadly, that of civilizations were analyzed. It is true that from the 18th century onwards, and particularly in the 19th, Catholic tension on scientific questions seemed to want to vindicate its contemporary detractors, thus contributing to the idea thatthis was its eternal attitude. The idea that the relationship between science and the Christian religion is by nature and eternally conflicting has thus endured in the teaching and culture of the Western world. It is the construction of this myth during the19th century that we will now explore; it goes far beyond the French borders. The "battle between science and the Church" has several parallel histories.

## An American Story

In the United States, this struggle has been the subject of an abundant and widely distributed literature, despite its often mediocre scientific quality. It was first illustrated by A History of the Life and Voyages of Christopher Columbus, written by the American historian and novelist Washington Irving. Published in 1828 in London and in the United States, the work had considerable success and was often republished. The author sets out a clear project: to report the life of the man who "by his bold genius, his unyielding resolution, and by his heroic courage" brought together "the two ends of the earth".[17](#17__Irving__1828__t__1__p__4). He tries to build a Columbushero of empirical science and daring adventurer, rational and man of progress, a Columbustriumphing alone of a Middle Ages folded on itself, with the help of logical deductions based on the reading of learned writings and observations from travelersThis work appeared in a very particular context and was exploited on bothsides of the Atlantic to install the idea of an eternal conflict between science and religion

Among the best-sellers in the history of myth, we must also include a book with a clear title, also very popular in its time: History of the Conflict between Religion and Science, published in 1874 by John William Draperalso been widely reprinted and translated on the Old Continent (from 1875 in French).Draperson of a British Methodist preacher, became a professor of chemistry at New York University in 1839 He published his work in the midst of a controversy between supporters of the theory of evolution and supporters of a literal reading of the Scriptures, in order to denounce attempts to control science by religion(s), using his perfect knowledge of both faith and science. From the first lines of the work, he aims more particularly at Catholicism, through the papacy, which would claim "the political supremacy" and "the return to the institutions of the Middle Ages".[18](#18__Draper__1875__p__V). Here again, it is not the reality of the conflicts of the 19th century that is the problem, but the rewriting of previous history: "the antagonism we are witnessing is the continuation of a struggle that began the day Christianity became a political power. Since that moment, Religion and science have been in presence[19](#19__Ibid___p__VI)". For Draperthe history of science must also account for the conflict between what he calls "on the one hand the expansive force of human intelligence; on the other hand the compression exerted by traditional faith and human interests"[20](#20__Ibid)the history of the shape of the Earth would be registered in a long fight made obligatory by the respective natures of science and religion, absolutely antagonistic; it is, for him, emblematic of it After a first chapter devoted to "The origin of science", the second is entitled limpidly: "The origin of Christianity. Its transformation at the time when it seized civil power. Its relationship with science. This second chapter opposes to Greek science, seen as a science of exactitude born of observation, a Christian doctrine which would absolutely refuse to look at anything else than the sacred texts:

The pagan party [...] maintained that science could only be acquired through the laborious exercise of observation and human reason. The Christian party, on the other hand, declared that the foundation of all science is in the Scriptures and in the tradition of the Church. [...] The Scriptures therefore contain the whole sum of necessary knowledge[21](#21__Ibid___p__38).

In this perspective, the question of the shape of the Earth is fundamental, because Augustineis presented as the major authority of Christian science, the one whose doctrine would have resulted in "putting theology in a state of antagonism with science[22](#22__Ibid___p__42)". He would have diverted the Bible from its true purpose by making it "the arbiter of scientific truth", and the reader cannot know here whether these are quotations or a reading summarized by Draper:

The earth has a flat surface; over our heads, the firmament is rounded like a dome or, as St. Augustine, stretches out like a skin from which tents are formed The stars, the sun and the moon move there to enlighten man during the day and the night. The earth was created from nothing, and the tribes that inhabit it, the plants and animals were made in six days; above the firmament are the heavens; in the abyss, below our feet, is hell and its darkness[23](#23__Ibid___p__45).

The debate on the shape of the Earth is associated with the question of creation ex nihilo and that of species, which inflamed the debates between science and religion at the end of the 19th century.

In this chapter, as in the one devoted to the "Conflict concerning the nature of the world[24](#24__Ibid___chap__6__p__109)we find under Draper's penall the arguments already invoked in the previous century by Voltaire.He presents the certainty of sphericity as a natural manifestation of reason and obviously quotes the "system" of CosmasIndicopleustes[25](#25__Ibid___p__110)who would have written his Christian Topography "with the aim of refuting the heretical opinion of the sphericity of the Earth[26](#26__Ibid___p__47)"Without trying to know if this text had any repercussion. As in the case of Virgil, we are witnessing here the use of a heretical character that is completely fanciful, but certainly very effective

Chapter 6 serves then to make the demonstration that the delay of science is indeed related to the only Christian Church: science prospers in the land of Islam, but"Christianity existed for fifteen hundred years that Christianity, had not produced a single astronomer[27](#27__Ibid___p__113)". It is a question of showing that the civil society can exceed the religious prohibition by the scientific curiosity, which the Occident is however deprived. If thus the Renaissance marks for him the return of a true knowledge of the world, it is by accident:

Even then, there was no impulse towards science. The motives that led to this were other than those of scientific curiosity: they were commercial rivalries, and it was three navigators, Christopher Columbus, Vasco de Gamaand especially Ferdinand Magellan, who definitively settled the question of the sphericity of the Earth[28](#28__Ibid___p_114).

Another version of the discovery of sphericity appears here, which would have been made almost by chance by sailors attracted by trade. Draperlends them some of the arguments in favor of sphericity that were developed in the astronomical writings of the Middle Ages, beginning with those of John of Sacrobosco:

The circular shape of the visible horizon, which seems to plunge into the sea, and the gradual disappearance of ships in the open sea, could not fail to dispose intelligent sailors to believe in the sphericity of the Earth. The writings of the Arab astronomers and philosophers had spread this idea throughout Europe; but it had been very badly received by the theologians[29](#29__Ibid___p__115).

If he points out that "the writings of the astronomers and the Arab philosophers had spread this idea throughout Europe", he opposes the hostility of the theologians to them without bringing any proof, nor citing a single source. He evokes without more supporting it, the intervention of the physicist Toscanelliwho, after astronomical studies would have "become partisan declared of the globular form of the Earth" and would have convinced his friend Columbus of it[30](#30__Ibid).

In reality, there was no direct relationship between the Genoese and Toscanelli, but the navigator was probably aware of a letter sent by the Tuscan scholar to the canon of Lisbon, a letter that contained not arguments on sphericity, but calculations to reduce the estimate of the radius of the Earth[31](#31__Crouzet__2018__p__27_28). Finally, he integrates the last elements of the myth by referring to the Council of Salamanca, which the French translation makes appear here as a "council":

But what was irreligious in his project was pointed out by the Spanish clergy and condemned in the Council of Salamanca. The orthodoxy of Columbuscomparing it with the texts of the Fathers, St. Chrysostom, St. Augustine, St. Jerome, St. Gregory, St. Basil, St. Ambrose; with the epistles of the Apostles, with the Gospel, the prophecies, the Psalms and the Pentateuch[32](#32__Draper__1875__p__115).

This passage is a copy, almost word for word, of Irving(seebelow)Draperadds thatVasco da Gamavoyageto India, passing south of Africa, and his discovery of new constellations "were perfectly consistent with the theory of the sphericity of the Earth", a confirmation whose "political consequences" would have placed "the Papacy in a very awkward position": indeed, "its traditions and politics forbade it to admit that the Earth could be anything other than a flat surface, [...] on the other hand, it was impossible to deny or conceal the facts[33](#33__Ibid___p__117). The coup de grâce (on the head of the pope) is produced by the return of the Sainte-Victoire [sic: i.e. the Victoria], Magellan, to its point of departure by sailing to the west: "the theological doctrines on the figure of the Earth were decidedly overturned[34](#34__Ibid___p__118)".

This text, which gives the appearance of an essay, signed by a scientist recognized in his time and benefiting from an unquestionable institutional position, constitutes a further stage in the construction of the myth of the flat Earth, making this belief the symbol of a scientific backwardness that has become more strictly religious than medieval. This pamphlet has no other interest than to allow us to evaluate the violence of the controversy that was taking place across the Atlantic at the end of the century. It had an enormous impact and other authors lent their pens to this battle.

Russel, inInventing the Flat Earth, mentions another American monument to this construction: the work of Andrew Dickson White(1832-1918), co-founder of Cornell University. In 1896, he published a work with a title similar to Draper:A History of the Warfare of Science with Theology in Christendom, translated into French under the title Histoire de la lutte entre la science et la théologie in 1899.

The work is actually quite different from Draper. It consists of twenty chapters, each devoted to a scientific question or discipline, and includes a chapter on geography and another on astronomy, preceded by a first chapter devoted to the creation of the world. Whiteis much more nuanced than Draperon the question of the shape of the Earth: despite an obvious tendency towards a Manichean reading indicated by the title, he is attentive to historical reality, which proves that it could be known by anyone who wanted to look for itHe thus recognizes that certain Fathers (certainly, the "broadest minds"), influenced by Platoand Aristotle, "accepted this conception willingly, but the majority was immediately frightened"[35](#35__White__1899__p__64). If the vision is less simplistic, the belief in sphericity is however necessarily given as a sign of open-mindedness and progressism. The continuation moreover details at length all the strange theories in which the Christians could believe, and the henceforth inevitable Cosmassees his authority reinforced:

This theory received its final form in the sixth century in a complete and detailed system of the universe, which claimed to be based on Scripture and whose author was the Egyptian monk Cosmos [sic] Indicopleustes[36](#36__Ibid___p__66).

Whitehowever, sees a clear influence of Egyptian theology:

but the theological world was unaware of this pagan origin; the doctrine was received as virtually inspired, and soon regarded as a fortress of biblical truth which the luminaries of the Church endeavored to render impregnable by external works of theological reasoning; the mass of the faithful regarded this doctrine as a direct gift from the Almighty[37](#37__Ibid___p__68).

In addition, he does not make of the theory of Cosmasa dogma as perennial as his predecessorsHe considers that Ambroseand Augustine"tolerated" sphericity, that Clement and Origen"even supported it" and that Isidore of Seville, "all chained that it was by the dominant theology on other points, dared to rise against the authority until then indisputable of Cosmos [sic] and to declare himself in favour of the sphericity of the Earth"[38](#38__Ibid___p__70).

Whitenothing like Draper: Thomasand Albert"were obliged to accept the doctrine of sphericity[39](#39__Ibid)Whitefinally concludes that "at the beginning of the modern period the great majority of thinkers" recognized sphericity, even though he makes "Luther, Melanchthon, and Calvin" opponents of the theory in the name of the Reformed doctrine ofscriptura sola.He has moreover in heart, further, to confess (if one dares to say): "the truth obliges to say that Protestantism was not less ardent to fight the new scientific doctrine" (that of Copernicus) than Catholicism[40](#40__Ibid___p__91_92).

With White, it is thus towards other episodes that the history of the conflict between the Church and science moves: he delivers an account much more detailed and much more documented, in spite of some fantasies, of the quarrel of the antipodes, quoting Albertthe Great, Vincent of Beauvais, Nicole Oresme, Pietrod' Abano and Ceccod' Ascoli, up to Pierre d' Aillywhom he makes the praise[41](#41__Ibid___p__76_77); he stops especially on the Galileo, because "the war against the theory of Copernicus, which until then had been rather moderate, took from then on a character of unheard-of violence[42](#42__Ibid___p__96)". If Whiteinscribes the legitimate fight for Darwinism in a long line of battles against the Church, he does not give credence to the idea of an entirely obscure Middle Ages and gives Columbus, Copernicusand Galileo their true discoveries We invite the reader to discover online - since the American Library of Congress has digitized almost all the press published since 1690 - in what terms he opposed science and religion[43](#43__L_une_de_ses_conferences).

## When the Collège de France enters the battle

time of the publication of Irvinga self-taught Hellenist and Latinist, Antoine-Jean Letronne- holder of the chair of history at the Collège de France - who gave its letters of nobility in France to the theses of the flat Earth and of the opposition of science and the Church, in avery differentcontexthoweverHe published an article entitled "Des opinions cosmographiques des Pères de l'Église rapprochées des doctrines philosophiques de la Grèce" (Cosmographic opinions of the Fathers of the Church compared with the philosophical doctrines of Greece) in the prestigiousRevue des deux mondes in 1834, which seemed to guarantee its scientificity. The aim of the article was, as its title indicates, to show that the beliefs "of the Fathers of the Church" "go back almost all to the philosophical schools of Greece" which preceded or competed with the hypotheses on sphericity, that is to say the pre-Socratic theories for the most part. However, and this is the whole problem, on the one hand Letronnetakes "as a basis for this examination"[44](#44__Letronne__1834__p__606) the Christian Topology of Cosmas(he relies on the edition of Bernard de Montfaucon), which obviously gives a totally fantasized vision of the doctrine "of the Fathers", and on the other hand, Letronne indulges in a few rather frightening generalizations in his study

The article thus lends credence to the idea, after others, that the position of Lactantiuswas that of the entire Western Christian Church: it affirms that, if there were indeed some Christian defenders of sphericity, the "partisans of the verbal interpretation" put forward hypotheses that "were united in the formal exclusion of the roundness of the Earth"The list of these last is confused with that of the Fathers: "Saint Augustine, Lactantius, Saint Basil, Saint Ambrose, Saint Justin martyr, Saint John Chrysostom, Saint Caesarius, Procopiusof Gaza, Severianus of Gabala, Diodorusof Tarsus, etc"[45](#45__Ibid___p__603_604). One can appreciate the "etc.".We have seen in the first part that this opinion really only concerned Lactantius and the Church of Antioch,not prevent Letronneaffirming that the medieval cosmographers were forced to admit the flat shape of the Earth, linking this hypothesis to that of its movement:

There was a time, and that time is not yet far from us, when all the sciences had to take their origin in the Bible. It was the only basis on which they were allowed to rise; and narrow limits were set to their development. The astronomer was allowed to observe the stars and make almanacs, but on condition that the Earth would remain at the center of the world, and that the sky would continue to be a solid vault, dotted with luminous points; the cosmographer could draw up maps, but he had to posit that the Earth was a flat surface, suspended miraculously in space, and supported by the will of God[46](#46__Ibid___p__601).

If, he said, one was authorized to admit sphericity, it was on the absolute condition of excluding the existence of antipodes[47](#47__Ibid___p__602).

He also recalls the "formidable censorship of theologians" exercised to hinder science throughout the Middle Ages, with the help of "three irresistible arguments, persecution, imprisonment or burning at the stake".[48](#48__Ibid). Evoking the arguments of Cosmas, he finally launches into a daring amalgam:

These arguments go back a long way, and in all times they have been found very good.Plutarchalready put them in the mouth of one of his interlocutors, a great enemy of the sphericity of the Earth and of the antipodes; we seereproduced from century to century, from Lactantiusand Saint Augustine, until the moment when the discovery of America and the voyage around the world of Magellancame to silence for ever the adversaries of the antipodes[49](#49__Ibid___p__607).

is true that Letronneaffirms that it is "the opponents of the antipodes" that "Magellan" silenced, but the link with sphericity is made just beforeLike Voltairebefore him, he lets believe that the quarrel of the Antipodes and that of sphericity are identical and that the "system" of Cosmasis authoritative

Letronneis only an article, and its purpose has nothing to do with the great construction of a history of the conflicts between science and religion as undertaken by the Americans half a century laterIt is, however, important for France, because the kinship of this text with the thesis developed in Irvingpublished in English at the same time, or with Drapera few decades later, is obviousLetronneexplicitly mentions in his introduction - even though the subject of his article is the shape of the Earth - the controversy with those he calls the "biblical geologists" who, like Burnet, Whiston, Kirwanand Deluchave succeeded "in making Genesis agree with their ideas[50](#50__Ibid___p__604). Burnet(† 1715) and Whiston(† 1752) were English theologians; Kirwan(† 1812) was an Irish chemist-geologist; and Deluc(† 1817) was a Swiss physicist-geologist

They all tried to reconcile their physical theories on the formation of the Earth withthe Genesis account, which implies, according to the different versions of the Bible, to date the formation of the Earth from 4,000 BC (if we rely on the Vulgate) or 5,500 years BC. (with the Septuagint). These theses were challenged in the18th century by the research of Benoist de Maillet(† 1738) on geological stratification and erosion, and then by Buffon († 1788) using an evaluation of the cooling time of the Earth, research described by Hubert Krivinewho has produced a complete history of these estimates. Buffon's research led to an increase in the age of the earth to 74,000 years, such an increase (even if it seems ridiculous compared to the current estimate of 4.55 billion years) that he was ordered by the Faculty of Theology to retract. What Buffon, estimating with humor that it was better "to be flat than hung[51](#51__Krivine__2011__p__21_58)". At the beginning of the 19th century, the theses of the "biblical geologists" were much more freely criticized.Letronnesees this controversy over the age of the Earth as a reproduction of the one that took place over sphericity Thus, the stupidity of the Doctors of the Church, who were convinced that the Earth was flat, gave birth to the stupidity of geologists who were as backward as their ancestors in Salamanca and refused to admit the length of geological time. It is amusing to note that Letronnenot add Newtonto his list, even though the English scientist accurately calculated the date of creation of the Earth at 3,998 BC, also based on the Bibleundoubtedly that the figure of the great English scientist does not fit well with that of a generalized submission of science toreligiousdogmasLetronnethus ensured the survival of these ideas already accredited by Voltaireand the Enlightenment, and, much more, covered them with the authority of the Collège de France, which at the beginning of the century, as today, was no mean

Notes

[1](#1_4). GautierDalché, 2013, p. 168

[2](#2_4). Copernicus,On the Revolutions of the Celestial Orbs [1543], trans. A. Koyré, Paris, Alcan, 1934.

[3](#3_4). Les Trois Mondes de La Popelinière, p. 85.

[4](#4_4). Mayaud, 2005, t. I, p. 91-121

[5](#5_4). GautierDalché, 1988, 2013.

[6](#6_4). GautierDalché, 2013, p. 196

[7](#7_3). Migne,Troisième et dernière encyclopédie théologique, t. 53, 1837, col. 437.

[8](#8_3). The History of Ireland, trans. 1840, p. 49.

[9](#9_3). Encyclopedia, volume I, 1751, "Preliminary speech of the editors", p. XXIV.

[10](#10_3). Montfaucon,Cosmæ Ægyptii monachi Christiana topographia, 1707, p. IV.

[11](#11_3). See F. Jacob, 2003, p. 53

[12](#12_3). Voltaire,Philosophical Dictionary, p. 272.

[13](#13_3). Ibid, pp. 278-279.

[14](#14_3). Ibid, pp. 383-384.

[15](#15_3). Cyrano,The States and Empires of the Moon, p. 55.

[16](#16_3). Perrault,Parallèle, p. 70.

[17](#17_3). Irving, 1828, vol. 1, p. 4

[18](#18_3). Draper, 1875, p.V.

[19](#19_3). Ibid, p. VI.

[20](#20_3). Ibid.

[21](#21_3). Ibid, p. 38.

[22](#22_3). Ibid, p. 42.

[23](#23_3). Ibid, p. 45.

[24](#24_3). Ibid. chapter 6, p. 109.

[25](#25_3). Ibid, p. 110.

[26](#26_3). Ibid, p. 47.

[27](#27_3). Ibid, p. 113.

[28](#28_3). Ibid, p 114.

[29](#29_3). Ibid, p. 115.

[30](#30_3). Ibid.

[31](#31_3). Crouzet, 2018, pp. 27-28

[32](#32_3). Draper, 1875, p.115.

[33](#33_3). Ibid, p. 117.

[34](#34_3). Ibid, p. 118.

[35](#35_3). White, 1899, p. 64

[36](#36_3). Ibid, p. 66.

[37](#37_3). Ibid, p. 68.

[38](#38_3). Ibid, p. 70.

[39](#39_3). Ibid.

[40](#40_3). Ibid. at 91-92.

[41](#41_3). Ibid. at 76-77.

[42](#42_3). Ibid, p. 96.

[43](#43_2). One of his lectures, "The Warfare of Science," delivered at the American Institute, was published in the New York Tribune on December 18, 1869.

[44](#44_2). Letronne, 1834, p. 606

[45](#45_2). Ibid, pp. 603-604.

[46](#46_2). Ibid, p. 601.

[47](#47_2). Ibid, p. 602.

[48](#48_2). Ibid.

[49](#49_2). Ibid, p. 607.

[50](#50_2). Ibid, p. 604.

[51](#51_2). Krivine, 2011, pp. 21-58.

CHAPTER II

One myth can hide another

is often to Galileothat contemporary popular culture associates the discovery of sphericity, a position that is difficult to maintain in works on the history of science, even in bad faith, and that is almost absent from the American works that we have mentioned Another tradition links, just as wrongly but in a way that seems less visibly implausible for the reader, the demonstration of sphericity to the discovery of the Americas and the first transatlantic voyages. We had a glimpse of this with the references to Columbus, Gama and Magellanin the works we explored in the previous chapterThe history of Galileo's trial and its historiographical aftermath has been the subject of many re-evaluations in recent years, and the posthumous fate of Columbushas just been the subject of a very comprehensive[1](#1__Crouzet__2018__dossier_additi) We therefore refer the curious reader to these works. We would now like to dwell on the way in which the myth of the Middle Ages believing in the flat Earthcarried, rooted and spread by the one (or ones) that were built around the character of Christopher Columbus.

A few decades before the third centenary of the discovery of the Western lands by Columbus, Voltairedeplores in hisEssay on morals that the inhabitants of Florence prefer to commemorate Amerigo Vespucci, a man who in his eyes deserves "no honors for having been, in 1498, in a squadron that ranged the coasts of Brazil", while Columbus, five years earlier, "had shown the way to the rest of the world"[2](#2__Voltaire__Essai_sur_les_moeur). In the 16th century, Columbusseems to be less known than Vespucci.He was ignored by Copernicusin hisDe revolutionibus orbium cœlestium: when the Polish scholar evoked "the islands discovered in our time by the princes of Spain and Portugal", he only mentioned America "so named after the ship's captain who discovered it".[3](#3__Copernic__Des_revolutions_des). Another clue suggests that in the first decades of the 16th century at least, the two events did not have the same impact. The letter Mundus novus, in which Vespucciannounced that he had discovered, on behalf of Portugal, lands that were neither the Indies nor new islands, but a new world, was published manyTheLetter to Louis de Santangel - which plays an equivalent role - supposedly written by Columbusin 1492 (and published a first time in 93) to warn the Secretary to the accounts of the Catholic Kings of his discovery was much less on the same period[4](#4__Descendre__2009__p__591).

Voltairecontributed to the rewriting of the history of these discoveries in the second half of the18th century.This century is the one in which "Vespucci", note Bartolomé and Lucile Bennassar, two specialists in Spain and the New World, to make Columbusthe "mythical character" that he still is in part today These authors note that the moment coincides with the beginning of the triangular trade and that, at the same time, the Colombian literature takes its rise[5](#5__Bennassar__2013__p__56). Columbusgradually became the embodiment of the triumphant modernity, the archetypal figure of the bold discoverer having allowed to extirpate from the Western thought the backward theories supposed to characterize the Middle Ages and especially Spain - necessarily inquisitorial, whose belief in a flat Earth is erected as an emblem

# I. CHRISTOPHE COLOMB, A HERO THAT PEOPLE WANT

As the fourth centenary of the discovery of America approached (1892), a new and fierce competition for the memory of the Genoese developed in France. A few years earlier, in 1866, Cardinal Donnet, Archbishop of Bordeaux, wrote a letter to Pope Pius IX - preserved in the diocesan library of Bordeaux - to "beg him to introduce the cause of Christopher Columbus", hoping to obtain the beatification of the navigator

Daniel Fabrewho also studied this process, considers that Donnetwas one of the active elements of a"pressure group" which, in the run-up to the Council of 1869, tried to obtain recognition for what he considered to be a true "apostolate of Christopher Columbus"[6](#6__Fabre__1998). The movement relied mainly on the work of a fervent Catholic, Antoine Rosellyde Lorgues, a lawyer by training and an Americanist, and then on that of an essayist no less fervent and a reader of the former, Léon Bloy, whose arguments are developed by DFabredevelops his arguments in his study.

Rosellybegan by publishing a first apology of the Genoese navigator in 1843,La Croix dans les deux mondes (1845), then undertook in 1853, at the request of Pope Pius IX, to write a complete biography of him, published in 1856 under the title Christophe Colomb. History of his life and travels according to authentic documents from Spain and Italy. He also wrote a work entitled Satan against Christopher Columbus, or the alleged fall of the servant of God (1876), in which he evoked the difficulties of making Columbus.

For Rosellyand Donnetmatter ofmaking the discovery of the New World an enterprise directly inspired by God and of linking the figure of Columbusto the CatholicThe work of Rosellyis thus presented by the archbishop of Bordeaux as a salutary reparation, at the same time on the scientific level, since one owes him "the rectification of many errors, the repair of involuntary omissions or premeditated omissions", and on the religious level, because it puts in light "the superiority of the views of the Church,its tutelary foresight, the fruitfulness of its action", while demonstrating that the discovery of the "new continent" (an inappropriate term for thelands discovered by Columbus) "was the triumph of Catholic inspiration", something that the Genoese actually claims in his writings The cardinal affirms in passing that the Church "granted its unofficial mediation" to the one "that the scholars, the men of court, the associations of cosmographers rejected".[7](#7__Donnet__1867__p__405). Léon Bloy, a few years later, apparently dazzled by Roselly, took up the case to continue the fight for beatification and in 1884 publishedLe Révélateur du globe. Christophe Colomb et sa beatification future, with a long preface by Barbeyd'Aurevilly.He borrowed from Rosellythe title "Revealer of the globe".

The trial for the canonization of Columbusnot take place (except in thetwentieth century, in the novel La Harpe et l'Ombre by Alejo Carpentier), but the steps taken by the archbishop and the work of Rosellyallow us to glimpse the issues that were at stake around the figure of the navigatorquestion for the Catholic Church, on the one hand of not leaving Columbusthe Protestants, nor to the supporters of secularism, and on the other hand of trying to side with progressRosellyis exemplary from this point of view.Published for the first time in 1856, it responds in reality to another enterprise of Colombian heroisation, that of the Protestant Washington Irving, mentioned aboveIn the first edition of his text, in fact, Rosellydescribes his motivations and names his opponents: "Never has a Catholic writer tried to retrace, completely, the life of Christopher Columbus, this Hero of Catholicism.The Protestant school alone had had, until that day, the privilege of telling us thisstory[8](#8__Roselly__1856__p__III)". A long introduction (in which he does not fail to mention the usurped glory of Vespucci) then allows him to draw up a historiographic and bibliographic balance sheet, which shows that publications about Columbusmultiplied at the beginning of the19th century, especially in Italy.

In this vast ensemble, Rosellyidentifies a "coterie" that has monopolized Columbusand observes that it "has remained in the hands of his natural enemies[9](#9__Ibid___p__30)". It is constituted by "the Genoese Giambattista Spororno, the American Washington Irving, the Spanish academician don Martin Fernandez de Navarreteand the illustrious Prussian Alexander de Humboldt", whose "authority [...] sanctioned the errors issued by the other three, aggravating them with the full weight of his own"[10](#10__Ibid___p__29). Of these four productions, only one is a true history of Columbus, the work of Irving. Its success is attested to in France by the existence of several translations and numerous cumulative reprints. However, whereas Irvingdescribed Columbusas a hero of empirical science and a rational adventurer, Rosellyinsists against a reduction of the Colombian adventure of which "the Protestant school" did not know how to see that it was "the accomplishment of a will from on High", "a providential intervention"In short "they stripped Columbusits spiritual greatness"[11](#11__Ibid___p__31_et_32).

The naturalist Alexander von Humboldtanother member of this "coterie", was a recognized and respected scholarHe is also cited severaltimes by Irvingin his biography of Columbusand vice versa, the naturalist paying tribute to the American historian in the preface to hisExamen critique de l'histoire de la géographie du Nouveau Continent et des progrès de l'astronomie nautique aux XVe et XVIe siècles (1814-1834).However, he considers Columbusin continuity with (and not in opposition to) those of thinkers like Roger Bacon, DunsScotus or Albertthe GreatHumboldtseems to distance himself from the general tendency to devalue the Middle Ages, but throughout the pages that follow, he sets out to construct the character of ascientificColumbus, "enlarger of the world, hero of progressThe naturalist is the one who initiated, let us recall, the expression "Great Discoveries" a few years earlier, an expressionflourished and is part of the great European narrative. Under his pen, the Genoese is credited with a "fixed plan", contrary to the approach of an "adventurer who relies on chance". Humboldtdescribes the project to reach Asia by the West by evoking the use of the astrolabe "recently invented", ignoring here the development of this instrument in theeighth century in Baghdad, according to an even older instrument[12](#12__Humboldt__Examen_critique__t). For Humboldt, the success of Columbuswas thus "a conquest of reflection", an expression that Irvinguses (quoting him expressly) at the end of his book One passage is particularly revealing:

The enlargement of man's empire over the material world, or the forces of nature, the glory of Christopher Columbusand James Watt, inscribed in the splendor of geography and the industrial arts, presents amore complex problem than the purely intellectual conquests, than the growing power of thought due to Aristotleand Plato, to Newtonand Leibniz[13](#13__Ibid___p__11_12).

The association of the Genoese with the inventor of the steam engine, surprising at first sight, clearly indicates from which intellectual perspective the world of the industrial revolution exploits the Columbus.

At least three conceptions of Columbusthus clash: anempirical scholar and adventurer of discovery in IrvingColumbus, arational and arrestedColumbusin Humboldt, and anempiricalColumbusbut above all a "messenger of Providence" (that of the Catholic God) in Roselly.The history of the editions ofRosellysColumbus is in this respect quite significant of the ideological confrontations accompanying the construction of the myth: if the first edition clearly intends to respond to what he considers to be a Protestant appropriation of the navigator, a prestige edition, sumptuously illustrated, in some places notably abridged and rid of its footnotes in order to reach a wider public, appeared in Paris, at the Société générale de librairie catholique in 1887.It is also adorned with a portrait of Pius IX and an excerpt from his letter to Roselly. If the very beautiful illustrations of the text and the quality of the edition say enough about the interest that the book had in the eyes of the Church, and its success with the readership, it is especially the profound transformation of the preface which is interesting.

In the first one, he targets, as we have seen, the Protestants. In the third, subsequent to the first requests for beatification, which Rosellyexplicitlyevokesin the text by naming the archbishop of Bordeaux, it is the "free-thinking" to which he is now opposedHe accentuates the scientific value to be granted to Columbusby making him the father of the modern science: "Thanks to him, we possess the first notion of the fundamental laws of this planet. Thanks to him, the shape and the extent of our habitation are finally known to us[14](#14__Roselly__1887__p__XXII)"and designates new adversaries: "Let the free thinkers know it well[15](#15__Ibid___p__XXIV)... " The long examination of the previous works, the opposition to the Protestant vision, the meticulous correction of the biographical errors contained in the first preface, have on the other hand disappeared.The modification of this text, considerably lightened on the scientific level, not only accompanies the publication of an abridged and general public version of the initial work, it also signals that Columbushas become the business of the defenders of secularism

# II. RETURN TO THE COUNCIL OF SALAMANCA

It is within the framework of this complex and virulent memorial competition that the instrumentalization of the myth of the flat Earth is established.The proponents of the different visions agree on one point: they need to make Columbusa hero who breaks with the official science of his time, including the Catholic party that wants to give a messianic image, which is not without contortions, since it is necessary to attack an "obscurantist" church to make Columbus.

The moment when the myth of the flat Earth was born is, in these Colombian epics, what has passed to posterity as the Council and sometimes the Council of Salamanca, a conference of scholars charged by the Spanish sovereigns to examine the possibility of the voyage proposed by Columbus.The holding of a series of meetings between the spring of 1486 and the end of the winter, in various places (Cordoba and Salamanca at least), at the instigation of the King and under the authority of Talavera, seems the only thing really attested[16](#16__Vignaud__1911__t__1__p__547). These conferences, in particular, were not placed under the authority of the University of Salamanca (there is no record of them), nor that of the convent of San Esteban, as both authors assert. Yet the episode is reported in great detail bybothIrvingand Roselly.In the pages that explicitly describe Salamanca, Irvingmentions in several notes one source and only one: theHistoria de la Provincia de San Vicente de Chyapa by Antonio de Remesal, a Dominican, who wrote one hundred and thirty years after Columbus, in 1619, and exposed his debates with the scholars of his time. Both are based on theHistory of the Indies by Las Casasand theHistoria del Almirante by Fernando Columbus, the navigator's son, two texts that evoke, albeit rather vaguely, the composition of the Council and what was said there.Fernando Columbusdescribes the hostility of its members towards his father and attributes to them an improbable scientific insufficiency[17](#17__Ibid). Like Las Casas, he relies on thenavigator'slogbook, which was quickly lost and whose transmission suggestspossible alterations.This logbook was in fact given to the Catholic Monarchs by the navigator on his return from his first voyage; they had a copy made that was given to Columbusand it was undoubtedly the one used by his sonThe version that circulates today is the one that has been reconstructed thanks to the summarized excerpts contained in theHistory of the Indies by Las Casas[18](#18__Bashet__2009_et_Bennassar__2).

There is therefore no source describing such an episode precisely. BothRosellyand Irvinghave romanticized it extensively, not afraid to invent from scratch what was missing in the archivesRosellyeven says that "the minutes of these sessions, imperfectly written two years after their date, have not yet come out of the Simancas Archives[19](#19__Roselly__1856__p__180)"How can they be considered "imperfectly written" if no one has ever read them?

should be noted, however, that neither Rosellynor Irvingmentions the holding of a Council The expression "Council of Salamanca", which only aggravated, in France at least, the supposed role of the Church, can be found, as we have pointed out, in the translation of Draperor inMercédès de Castille. History of the time of Christopher Columbus by Fenimore Cooper.In both cases, however, it is a translation of the English wordcouncil, a term also used by Irving, and which very commonly means "council".The transformation of the "council of Salamanca", a term that is not too far from the truth, into a "council of Salamanca", an expression that has nothing to do with the reality of the facts, isperhaps a simple error of translation, but it was heavy in meaning

In any case, it is in the detail of the extremely circumstantial accounts invented by the two authors that the myth of the flat Earth and especially its association with the Church took root. Irving, first of all, is ambiguous: he does not expressly say that the Earth was believed to be flat. He even seems to affirm the opposite, since he writes that "the circumference of the Earth was still unknown", and specifies: "neither were the laws of specific gravity and central attraction known, according to which, by granting the Earth's rotundity, the possibility of going around it became evident".[20](#20__Irving__1828__t__1__p__49_50).

In the same way, in his (very graphic) evocation of the "council of Salamanca", he concedes that some of the participants, "more versed in science, admitted the spherical form of the Earth[21](#21__Ibid___p__102)". But he needs at the same time to demonstrate that the Genoese had conceived a "system". In the chapter entitled "Reasons for Columbusbelief in the existence of lands yet to be discovered in the West," Irvingasserts that Columbus, based on Ptolemy, would have "posited as a fundamental principle that the Earth was a sphere or terraced globe, which could be circumnavigated from east to west and that there were antipodes[22](#22__Ibid___p__44)". The text is thus rather contradictory.

is finally in chapter 4 of book II that he puts in scene the "council", composed "of professors of astronomy, geography, mathematics and otherbranches of sciences, as well as several dignitaries of the Church and erudite monks[23](#23__Ibid___p__97)". The typical nineteenth-century discourse on the necessary incompatibility of science and religion joins here the commonplaces on the ignorance imputed to the Middle Ages:

At that time, and more particularly in Spain, religion and science had the most intimate relationship. The treasures of literature were locked up in the monasteries, and the professorships were occupied exclusively by ecclesiastics[24](#24__Ibid___p__96).

All questions were considered through the prism of the prejudices of those centuries when the torch of antiquity, extinguished by barbarism, had ceased to illuminate the world, and where faith had been put in the place of examination[25](#25__Ibid___p__99).

While admitting, as did Roselly, that Columbusreceived the support of a Dominican by the name of Deza, Irvingdescribes with irony the arguments that the Genoese would have had to face, using the now well-known quotations from the Bible or the Fathers of the Church, from Lactantiusto Augustine:

Instead of hearing scientific objections, Columbuswas bombarded with quotations from the Bible and the Testament, the book of Genesis, the psalms of David, the prophets, the Epistles and the GospelsThen the explanations of various saints and revered commentators, of St. Chrysostomand St. Augustine, of St. Jerome and St. Gregory, of St. Bazilus and St. Ambrose, and of Firmianus Lactantius,formidable champion of the faith,were added to it[...] Thus, for example, the possibility of antipodes in the southern hemisphere, an opinion so accredited among the most learned of the ancients [...] became a stumbling block for the scholars of Salamanca[26](#26__Ibid___p__99_100).

One recognizes, under Irvinglegacy of the Enlightenment:

The passage borrowed from Lactantiusto confound Columbusis written in a style of big joke and burlesque irony, unworthy of such a serious theologian. "Is there anything so absurd, he asks, to believe that there are antipodes with their feet opposite ours; people who walk with their heels up and their heads down?"[27](#27__Ibid___p__101).

In all logic, the account of this Council of Salamanca, leads to the affirmation that the sphericity is indeed a "proposal" of Columbus:

To the simplest of his propositions, the spherical shape of the Earth, his opponents opposed figurative texts of the Scripture. They objected that it was said in the Psalms that the heavens are spread out like a skin [...] and that Saint Paul, who in his Epistle to the Hebrews, compared heaven to a tabernacle, or tent, spread out over the whole Earth, from which they inferred that it must be flat[28](#28__Ibid___p__102).

One argument placed by Irvingin the mouths of the Council members is particularly worthy ofIrving, as we have said, is clevernot to assert ignorance of sphericity as a universal fact Among the members of the council, some admit it, or pretend to admit it, but then oppose the navigator with a singular argument:

Finally, and this was not the least absurd objection, it was argued that, even if a vessel succeeded in reaching the tip of the Indies in this way, it could never return; because the roundness of the globe would present a sort of mountain, which it would be impossible to climb, even with the most favorable wind[29](#29__Ibid___p__103).

This sentence seems to be taken directly from Fernando Columbus' story:

[The cosmographers told the King that] if someone had made the journey, he would never return by the same route, but he would be obliged to go up the sea, like a kind of mountain, which was impossible whatever favorable wind one had[30](#30__Fernando_Colomb__La_Vie_de_C).

This strange belief in the impossibility of "going back to the sea" is also a school memory to which the majority of the people we interviewed testified, and they remember that it was presented to them as a "fear" of sailors. It seems to be more an invention of Fernandoto magnify the courage of his father, because the account of the crossing by Columbusbears no trace of these fearsIt can also be interpreted as a way of emphasizing the incompetence or naivety of the membersthe Council, as emphasized by Fernando Columbus, by lending them an absurd way of conceiving of sphericity, as if the Earth had a top and a bottom This is once again a good example of manipulation (almost in real time, one might say), because if the expression is found in Renaissance works, it is not associated with a fear, nor with an argument against sphericity, but testifies on the contrary to an imagined way of speaking (as we say today that we go up from Bordeaux to Paris or that, in the opposite direction, we go down to the seaside), a way of speaking that seems to us to signal above all the internalization of cosmological and cosmographic representations. as Russel, we find similar images inJohn of MandevilleJourney Around the Earth, written in the14th century:

So I have seen three quarters of the whole roundness of the firmament, plus five and a half degrees. That is why I say with certainty that a man could go around the whole earth of the world, both over and under and return to his country if he found companions and a ship to lead him and he would always find men, lands and islands just like in our countries.

You know that those who are on the side of the Antarctic are exactly feet against feet of those who dwell under the Tramontane, just as we and those who dwell below us are feet against feet, for all parts of the land and sea have their opposites inhabitable and crossable and here and there [...]. For when one goes from Scotland or England to Jerusalem, one always goes up, since our land is in the lower part of the earth towards the west,as the land of John the priest is in the lower part towards the east[31](#31__Mandeville__Voyage_autour_de).

It also appears in the small Globe of the world we mentioned above, where it is used in exactly the same context ("we marvel at how our antipodes, who walk with their feet opposite ours, can climb against the Earth", see above).

Other elements are particularly interesting in order to better understand how the myth constructed about Columbuswas able to strengthen the myth about the flat EarthIrvinguses a social and anti-elitist argument that is frequently invoked, clearly tinged with anti-clericalism.Columbusis thus an "obscure man" or an "obscure stranger"[32](#32__Irving__1828__t__1__p__127_e)an

obscure navigator, not being member of any learned assembly, deprived of this dazzling entourage which sometimes gives to mediocrity or even to silliness the authority of an oracle, he had for only support the force of his genius[33](#33__Ibid___p__98).

In the same place, he is described as "a simple sailor presenting himself without fear in the midst of an imposing circle of professors, monks and dignitaries of the Church[34](#34__Ibid)". Today's delightful language would say: a self-made man standing up to the establishment. The round Earth, therefore, belongs to the genius of the humble, the flat Earth to the bigots and those who proclaim themselves experts.

The version of Roselly, although catholic, leads to a similar result.He postulates, him also, that theproject of Columbussupposes for principle a sphericity which is not yet admitted:

The muleteers and nannies at least knew that a foreigner was trying to prove that the Earth is as round as an orange, and that there are countries where men walk upside down; moreover, that by continuing to sail straight to the sunset, one would return by the east. The public was perhaps astonished that one treated so seriously a similar joke[35](#35__Roselly__1856__p__182).

He, too, portrays some of the members of the assembly as imbeciles clinging to quotations from Lactantiusand Augustine.Relying on the same sources as Irving, and probably inspired by him, he delivers an identical, highly romanticized description of the examination of Columbus:

Some members of the Junta objected to his deductions from the Holy Scriptures, which they applied very badly, and from the truncated fragments of some ecclesiastical authors contrary to his system. Some "cathedraticos" professors established by major and minor that the Earth is as flat as a carpet and cannot be round, since the Psalmist says: "Extendens coelum sicut pellem", which would be impossible if it were spherical. The words of St. Paul, comparing the heavens to a tent spread over the earth, which excludes the roundness of this world, were opposed to him[36](#36__Ibid___p__186).

The book, however, presents subtle differences in the construction of the myth. Roselly, aCatholic, must nevertheless try to save the role of the ChurchHe therefore insists logically more than Irvingon the diversity of opinions then in progress, a motive just as false as the idea of an almost unanimous belief in the flat Earth, but which has the advantage of not presenting the question of the Earth's shape as a Christian dogma:

Some firmly believed that the Earth was the largest body in the visible creation, the fixed center of the universe. Therefore, they thought it natural that the sun revolved around it. [The others considered that the Earth was a flattened circle or an immense quadrilateral, bounded by an immeasurable mass of water. These, admitting the quadrangular or circular, but always flattened shape of the Earth, limited the extent of the seas to the seventh of the solid part of this world. Those, without clearly forging a system, considered as a dream any idea contrary to the ancient authors[37](#37__Ibid___p__185).

The first opinion, one notes it, does not exclude, on the contrary, the sphericity.But Rosellyis careful not to say it, shifting the debate to another question: "to hold for a dream any idea contrary to the ancient authors", is to hold to the immobility of the Earth and to the center of the world.And to bring Columbusand Galileotogether without saying so.

He also insists on the scientific quality of the commission:

The Junta was composed of the professors of astronomy and cosmography in possession of the first chairs of this University, and of the principal geographers or geometers who had studied mathematicsunder Master Apollonius, and physics under Master Pascual de Aranda[38](#38__Ibid___p__182).

This actually allows him to put the responsibility for the belief in a flat Earth solely on the theologians, whom he equates with the scholastics, thus activating another of the myths coming from the humanists themselves: the sterility of scholasticism. One noted the reference to the cathedraticos and the reasoning "by major and by minor", he becomes more explicit a little further by naming "the obstinate scholastics"[39](#39__Ibid___p__189). As with Irving, this work of undermining is revealing: it is a question of making Columbusa man of experience:

When he replied with reasons drawn from experience and nautical science, he was countered with the authority of Lactantiusand Saint Augustinecondemning the absurd opinion of those who believe in the antipodes[40](#40__Ibid___p__187).

Irving, this experience is not contradictory with religion, on the contrary: it is for him the sign of the faith of the humble against the pride of knowledge imbued with itselfRenouncing, according to Roselly, to attract the "theologians" on the ground of science, Columbusconfronts them with their own weapons, those of the Scriptures, "developing with magnificence, these same sacred texts in which they had believed to show him his condemnation[41](#41__Ibid___p__188)". It is thus that "the ardor of his apostolate seemed then to transfigure him in the eyes of his audience". Indeed:

faith would not have infused him with nautical science, the fruit of practice and observation, but his faith having obtained the grace of God, he did what others would not have dared to do. [...] His assiduous contemplation of Nature having persuaded Columbusthat the spherical form is that of the great bodies of Creation, of the stars and of the worlds, he started from this principle that the Earth was round. His conception of the divine work being proportionate to his elevated notion of the Creator, [...] he soon found in his knowledge of the Holy Scriptures the confirmation of his cosmographic ideas[42](#42__Ibid___p__390_391).

Here we see how Rosellyattempts to reverse the treatment of the myth in favor of the Church In an amusing way, the shape of the Earth becomes a marker of faith and a dividing line between the good and the bad. There are those who do not believe in sphericity (the scholastic theologians) and those who do, like the Dominicans or the Franciscans, orders both pious and learned. Thus, at the time of the episode of the Council, "only the Dominican religious of Saint-Etienne listened to it with attention and favor[43](#43__Ibid___p__186)". Columbusis a new messiah who brings about conversions, as when he visits the monastery of La Rabida, where, after leaving Portugal, he is welcomed by the prior, Juan Perez de Marchena.This very real character becomes under the pen of Rosellya kind of Saint Paul of the sphere:

He listened, he understood and he believed.

Thus, in this peaceful convent of Franciscans, the broadest conception of humanity was developedby genius, welcomed by enthusiasm In this convent one believed with an implicit and sudden faith in the sphericity of the Earth[44](#44__Ibid___p__162_163).

This delirious passage shows to what extent the myth of the flat Earth had become in the nineteenth century an essential argument, embodied here by Christopher Columbus, of the ideological struggle of the Churches among themselves, of the Church against secularism (and vice versa) and, much more than in the Middle Ages, of the Churches against science, at a time when the literal reading of the Bible was once again coming into play in an essential quarrel, that of Darwinism

Let us simply reiterate, before continuing our investigation, that we can affirm without trembling that the literati of the 15th century did not doubt the sphericity of the Earth and that this knowledge was widely shared in the circles of lisant-écritants and a little beyond. Columbus, annotated in his hand - theImago Mundi of Pierre d'Ailly, published between 1480 and 1483 - contains discussions on the true circumference of the Earth, comparing measurements that had been made before[45](#45__Crouzet__2018__p__31). the uncertainty about this circumference that the navigator actually tried to use to minimize the length of the voyage and convince the Talavera.Fernando Columbus, in the book dedicated to his father, specifies the reasons that pushed him to leave, including the observation made by several navigators that only the western part of the globe remained to be discovered, beyond the Azores and Cape Verde, and that this space can only make at most "the fourth part of the globe"Las Casas,who takes up Fernando, explains Columbusdimensions of the EarthHe states that Columbusknew that between the eastern end of India, of which Ptolemyand Marin of Tyrehad been aware, and the Azores, which were the westernmost lands then known, there are "fifteen hours out of the twenty-four that there are for the circumnavigation of the globe" (fifteen time zones we would say today), and that he knew the opinion of Alfraganus (Al-Farghānī,see I,III, 2) and his followers who "give the sphere a much smaller turn than all other authors and cosmographers," estimating the distance between each of its degrees to be "not more than 56 miles two-thirds .[46](#46__Las_Casas__Histoire_des_Inde).

Denis Crouzethas shown how Columbusindeed aware of thisninth century measurethrough the Imago Mundi of Pierre d'Ailly[47](#47__Crouzet__2018__p__32_33). But, to convert these "56 and two-thirds miles", the navigator used, in an inconsistent manner, the value of the nautical mile and not the Arabicmīl (in today's units, the mile used by Columbuswas worth 1.481 km against 1.9735 km for theArabicmīl) Thanks to this deliberate confusion, he obtained a value for the circumference of the Earth of 20,400 miles, or about 30,000 km. To this narrowing of the circumference, Genoese adds an exaggerated extension of the extent of the land between the Azores in the west and Cipango (Japan) in the east. He stretched it to 225 degrees of longitude (instead of less than 180 degrees) by using Marco Polo's account in his estimation of the longitude of Cathay (the kingdom of the Great Khan, king of the kings of the Indies) and by adding 30 degrees from Cathay to Cipango. In theend, he succeeded in dividing by three the supposed distance to the western lands, all in order to make the expedition feasible

The project of the expedition was not at all to demonstrate the sphericity of the Earth, despite what Irvingand, before him, the one whose work he mentions several times: Voltaire.In hisEssai sur les mœurs, the philosopher stated that Columbus"had promised a new hemisphere" and was told that "this hemisphere could not exist"[48](#48__Voltaire__Essai_sur_les_moeu). No member of the Talaveracould object to the navigator that there were no antipodes

However, the Genoese's enterprise was very audacious given the length of the crossing, since the existence of a continent between Europe and the Indies was unknown. It is likely that this distance was seen as impassable and raised many objections. The anxiety of the sailors recruited by Columbusin this adventure is realistic, considering the supposed duration of the crossingIt is confirmed by his concrete and precise strategies - described in hislogbook - to underestimate the distances covered each day (since he had announced a total distance shorter than in reality) and thus reassure his crewmen, who were worried that they would not see land approaching[49](#49__Voir_les_extraits_du_journal). Let us note in passing that research on the precise size of the Earth did not stop with Columbus.following centuries, geodetic measurements were refined andin Xavier Campi's bookyou will find[50](#50__Campi__2014)a fascinating account of the development of this science before and after Newton.

The historiographic development of Columbusappears to be quite revealing of the way in which certain historical episodes are used within religious, political or ideological constructions, without necessarily having any connection with the reality of historyThe myth of Columbuscarried the myth of the flat Earth, and these two legends, both fabricated, have been used to rewrite the history of science and history itselfThe great success of Irvingin the United States as well as in Europe, relayed by that of Rosellyin Catholic circles and beyond, is one of the explanations for the entrenchment of this double myth in people's consciousness

Notes

[1](#1_5). Crouzet, 2018 (additional file to 2006 ed.).

[2](#2_5). Voltaire,Essai sur les mœurs, vol. IV, p. 101.

[3](#3_5). Copernicus,Of the Revolutions of the Celestial Orbs, I, 3, p. 19.

[4](#4_5). Descendre, 2009, p. 591

[5](#5_5). Bennassar, 2013, p. 56

[6](#6_5). Fabre, 1998.

[7](#7_4). Donnet, 1867, p. 405

[8](#8_4). Roselly, 1856, p.III.

[9](#9_4). Ibid, p. 30.

[10](#10_4). Ibid, p. 29.

[11](#11_4). Ibid, pp. 31-32.

[12](#12_4). Humboldt,Critical Review, vol. 3, p. 10.

[13](#13_4). Ibid. at 11-12.

[14](#14_4). Roselly, 1887, p.XXII.

[15](#15_4). Ibid, p. XXIV.

[16](#16_4). Vignaud, 1911, t. 1, p. 547-600

[17](#17_4). Ibid.

[18](#18_4). Bashet, 2009 and Bennassar, 2013.

[19](#19_4). Roselly, 1856, p. 180

[20](#20_4). Irving, 1828, vol. 1, pp. 49-50

[21](#21_4). Ibid. , p. 102.

[22](#22_4). Ibid. , p. 44.

[23](#23_4). Ibid. , p. 97.

[24](#24_4). Ibid. , p. 96.

[25](#25_4). Ibid. , p. 99.

[26](#26_4). Ibid. , p. 99-100.

[27](#27_4). Ibid. , p. 101.

[28](#28_4). Ibid. , p. 102.

[29](#29_4). Ibid. , p. 103.

[30](#30_4). Fernando Columbus,The Life of Cristofle Columbus, p. 54

[31](#31_4). Mandeville,Voyage Around the Earth, p. 139.

[32](#32_4). Irving, 1828, vol. 1, pp. 127 and 106

[33](#33_4). Ibid. , p. 98.

[34](#34_4). Ibid.

[35](#35_4). Roselly, 1856, p. 182

[36](#36_4). Ibid. , p. 186.

[37](#37_4). Ibid. , p. 185.

[38](#38_4). Ibid. , p. 182.

[39](#39_4). Ibid. , p. 189.

[40](#40_4). Ibid. , p. 187.

[41](#41_4). Ibid. , p. 188.

[42](#42_4). Ibid. , p. 390-391.

[43](#43_3). Ibid. , p. 186.

[44](#44_3). Ibid. , p. 162-163.

[45](#45_3). Crouzet, 2018, p. 31

[46](#46_3). Las Casas,History of the Indies, I, p. 113.

[47](#47_3). Crouzet, 2018, pp. 32-33.

[48](#48_3). Voltaire,Essai sur les mœurs, vol. IV, p. 99.

[49](#49_3). See the excerpts from Columbus' logbookreported by Las Casas inHistory of the Indies, vol. I, p. 308 ff.

[50](#50_3). Campi, 2014.

CHAPTER III

Understanding the success of the myth

The study of the heroisation of Christopher Columbusprovides many elements of explanation for understanding the issues that are indirectly at stake around the question of the flat Earth, which has become the emblem of broader struggles, for or against secularismThe enduring success of the myth cannot be understood without taking into consideration the particular context of the19th century, marked, like the Enlightenment, by the double question of secularism and anticlericalism, but also, in a different register, by a very particular way of writing history.

# I. THE FLAT EARTH AND THE STRUGGLES OF THE CENTURY

The influence of positivism

On the intellectual level, the 19th century saw the spread of the theses of the philosopher Auguste Comte(† 1857), which profoundly influenced theconception of the history of human societies. In his famousDiscourse on the Positive Spirit (1844), which synthesizes his Course in Positive Philosophy (published between 1830 and 1842), Comtesketches the history of the intellectual evolution of society through three theoretical stages, which apply, according to him, to the individual as well as to the human species. The first stage - associated with childhood, a period of predilection for unsolvable questions such as "why" - would be characterized by a theological boom. Within this period, Comtedraws a progression from fetishism through polytheism to monotheism, culminating in the development of "the universal feeling, hitherto almost insignificant, of the necessary subjection of all natural phenomena to invariable laws[1](#1__Comte__Discours__p__48)". There follows a second stage - associated with adolescence - by which the explanation of nature by supernatural agents is replaced by an understanding with the help of entities or personified abstractions. This stage, described as "metaphysical", is the transition to the installation of a "true philosophy", thanks to which the "mysterious searches" of theological or metaphysical explanations have been abandoned. "The human mind renounces "absolute research" and "circumscribes its efforts in the field [...] of true observation, the only possible basis of truly accessible knowledge, wisely adapted to our real needs[2](#2__Ibid___p__65)". The last stage of positive philosophy, which Comteassociates with "virility", consists in "substituting everywhere for the inaccessible determination of causes the simple search for laws,that is to say, for the constant relations that exist between the observed phenomena[3](#3__Ibid___p__66)".

The assertion that all our knowledge is relative to our senses leads Auguste Comteto assure that "no astronomy could exist in a blind species, [...] nor towards obscure stars[4](#4__Ibid___p__88)"which the development of spectral analysis denied after his death. But the representation of a knowledge evolving in a gradual and linear way towards more and more precise knowledge has had a lasting impact on the philosophy of science (and of education) from the second half of the 19th centuryonwards.It also strongly contributed to the construction of the Galilean figure: if some have chosen Columbusand 1492 as the date of an epistemological break, Comteplaces it later, in the 1600sHe stands out, as Annie Petit, who annotates this edition of hisDiscourse, points out, from the philosophers of the Enlightenment "who described the Middle Ages as a time of obscurantism and superstition[5](#5__Ibid___note_2_de_l_editrice)". But he qualifies what precedes 1600 as a "pre-scientific" era, another expression that was very successful and long used: "the true scientific spirit is so modern and still so rare, that no one perhaps before Galileohad even noticed the increase in speed that a body experiences in its fall[6](#6__Comte__1er_tome_du_cours__183)The true scientific spirit is so modern and still so rare, perhaps no one before Galileo had even noticed the increase in speed that a body experiences in its fall," he wrote, for example, about mathematics in the first volume of his Course, which is another historical untruth.

## The Free Thought

In France, the Third Republic inherited an "amputated positivism", as Dominique Lecourt puts it[7](#7__Lecourt__2004__p__746)the republican and anticlerical. The social reform that the Republic promised to build had to "be based on an intellectual reform organized around the method of sciences, which challenges any theological or metaphysical dogma[8](#8__Ibid___p__747)". The stereotype of a Church that would have clung to the dogma of the flat Earth was durably anchored in the discourses of this century, with Augustineas a privileged target who, as Proudhon(in a text evoking the notion of prejudice!) "believed the Earth to be flat, because it seemed to him to see it so[9](#9__Proudhon__1840__p__7__Cette_a)".

From the second half of the 19th century onwards, intellectuals - politicians such as Louis Blancand Georges Clemenceau, scientists such as Marcelin Berthelotand Paul Bert, writers such as Victor Hugo, historians such as Jules Michelet- asserted themselves as freethinkers, i.e., engaged in a fight for freedom of conscience against the Church and its clergy, whose values were, in their eyes, irreconcilable with those of the Republic. This fight was at the center of the electoral debates during the legislative elections of the IIIrdRepublic,whether it was the support to the bill on associations, the abrogation of the Concordat, the secularization of justice, hospitals, prisons and more generally, the separation of the Church and the State. The Libre Pensée movement develops - through speeches, congress reports, press articles, public conferences - the opposition between science and faith. It keeps alive the memory of the historical conflict which would have always set them against each other.

The examination of the monthly Bulletins de la Fédération française des libres penseurs (BMFFLP) of the year 1892 (on line on Gallica) interests our study.One finds there the call to the freethinkers of all countries to participate in the Universal Congress which is to take place in Madrid in October 1892; it is a question of celebrating the fourth centenary of the first crossing of Columbus, which it is important to celebrate particularly in this catholic fortress which is "the old country of Torquemada":

The discovery of America is, in the end, nothing else than the triumph of positive science over the chimerical science of theology, and that of Free Thought over the dogmas of an absurd religion. the Bible in hand, the Council of Lisbon, presided over by a bishop, and the Junta of Salamanca, dominated by theologians, delayed the departure of Columbus, disapproving of his plans, which they stigmatized as foolish and heretical, and forcing him to flee from Portugal and come to endure mortal anguish in Spainfrom where he was also to leave discouraged and indignant, when the civil power, by a sudden return, abandoning the vain theology,put itself resolutely to the service of the positive science represented in the person of the immortal navigator[10](#10__BMFFLP__1892__p__629).

Columbusis thus seen as a "precursor" (another expression to be banished, because necessarily teleological) of the positive science theorized by Auguste Comte, and the "Junta de Salamanca" as the archetype of a theological approach characterizing the infancy of humanityIn the opposition of science and theology, Columbusis naturally the hero of science. Fifteen years after the approach of the archbishop of Bordeaux to the pope to obtain the canonization of the evangelizing "Admiral", the appeal of the organizers of the Universal Congress appropriates in turn, but with exactly the opposite meaning, the Colombian adventure:

Yes, the discovery of America is our triumph! It demonstrates the vanity of the knowledge of theologians, and the infallible truth of experimental science; it demonstrates at the same time, that it is only by breaking the shackles of religious errors and by boldly following the current of modern ideas, that the civil power can accomplish great and fruitful works[11](#11__Ibid).

The debate about the Earth's roundness is not explicitly mentioned, but what else could be the "infallible truth of experimental science" that religion would have wanted to impede? What could be "heretical" about the attempted crossing if not to reject the (supposed) dogma of the flat Earth?

One must indeed be very ignorant, or deeply blinded by Catholic passion, not to understand that the day the discovery of the New Continent was an accomplished fact, the scaffolding of biblical-Catholic hypotheses and fantasies should have collapsed like a house of cards[12](#12__Ibid___p__680).

Convinced that the belief in these "biblical-Catholic fantasies" was that of the whole Church, the denouncers repeated over and over again the (apocryphal) credo quia absurdum that Paul Laffargue, Paul Bert, and so many other free thinkers considered exemplary of "the state of mind of the faithful[13](#13__Lalouette__2002__p__235)". It is an echo of this false quotation that Voltaireattributes to Saint Augustine- his favorite target - in one of hisDialogues: "I believe it, because it is absurd[14](#14__Voltaire__Dialogues_philosop)". Catholics were the main target of this irony, because, like the American Draper, freethinkers spared Protestants, whom they considered to be victims of "Catholic tyranny" A thesis that the freethinkers who wrote the appeal to the Madrid congress took up as their own[15](#15__BMFFLP__1892__p__630).

The anticlericalism that transpires from the declarations of this congress reveals the expectations of the "celebration of positive science" for this movement, as Lecourt mentioned in the article quoted above.

## The fight around Darwin

is in this general context of religious and intellectual tensions, but also ofhistoriographicpracticeshave become unacceptable today, that the double myth of medieval obscurantism[16](#16__C_est_l_occasion_de_signaler) and of the flat Earth. It is likely, moreover, that other factors have contributed to making matters worse. We have mentioned the controversy over the age of the Earth, which began in the 18th century and continued into the 19th. The discovery in 1861 of a missing link between the dinosaur and the bird confirms the need to increase considerably the duration of these geological times, to take into account that necessary for the evolution of fauna and flora[17](#17__Krivine__2011__p__54).

Underlying this method, the theory of evolution exposed in The Origin of Species (published by Darwinin 1859) constitutes an absolute break with theological explanations of the appearance of species, like heliocentrism with the Ptolemaic system.Reissued six times until 1872, and translated into French in 1862, the work, as we know, quickly provoked a confrontation between "the biblical geologists", as Letronneand those who supported "transformism"White, in his work already cited, compares the effect of this publication to that of "a plough in an ant-hill" and lists the numerous and lively reactions of the theologians of the time[18](#18__White__1899__p__53).

This confrontation had precedents - quite few, in fact - that it was tempting toinvoke to demonstrate the Church's intrinsic hostility to scienceThe very real confrontation over the movement of the Earth in the17th century, of which Galileowas the most famous victim, should have been enough to illustrate this, without having to look for a flattening of the Earth that never took place.There was, however, a strong desire to demonstrate - as the chemist and politician Marcelin Berthelot- that "Rome has been the center of oppression of science and thought for more than fifteen hundred years[19](#19__Cite_par_Lalouette__2002__p)".

# II. A HISTORY OF GREAT MEN

Like a flight of gyrfalcons out of the native charnel house,

Tired of carrying their haughty miseries,

De Palos de Moguer, truckers and captains

Were leaving, drunk with a heroic and brutal dream.

They would conquer the fabulous metal

That Cipango matures in its distant mines,

And the trade winds tilted their antennas

To the mysterious edges of the western world.

Every night, hoping for an epic tomorrow,

The phosphorescent azure of the Tropical Sea

Enchanted their sleep with a golden mirage;

Or bent over the front of the white caravels,

They watched as the unknown sky rose

From the bottom of the ocean of new stars.

José-Maria de Heredia, "Les Conquérants",Les Trophées, 1893.

Attracted by the "fabulous metal" that the Indies and Cipango (Japan) were imagined to be full of, but terrified at the idea of approaching "the mysterious edges of the Western world", where one risked falling without ever being able to "climb back up", the "discoverers" of the New World were therefore celebrated on both sides of the Atlantic. The way in which history was written was certainly not unrelated to the success of the myth, and was itself closely linked to the intensity of the ideological conflicts we have just mentioned. Indeed, the need to discredit the old centuries (Church(s) but also the Old Regime) was accompanied by the construction of heroic figures erected as symbols of the struggle for modernity.

## Monuments and symbols

At the end of the 19th century, monuments to the glory of ColumbusItaly and especially in Spain. In the squares of the big cities, the statues erected at that time show the different figures of the hero that we have met in the literature: the scientist-discoverer represented with one hand holding a scroll (a map) and the other pointing to the sea (Barcelona, 1888), the adventurous sailor holding a rudder (in the monastery of La Rábiba), the evangelist-revealer of the globe holding a Christian banner with a globe at his feet (Madrid, 1885). Some of them clearly exploit the association that popular culture makes between Columbusand sphericity, thus contributing to anchor this ideain the collective imagination: he is represented with his hand resting on a globe in Santa Margharita de Ligure (1882); a bas-relief of the monument shows him in Salamanca, addressing the members of the famous Council while pointing to a globe placed on a table

The Louvre Museum has a painting entitled "Christopher Columbusbefore the Council of Salamanca", by the American painter Emanuel Leutzein 1841[20](#20__https___fr_wikipedia_org_wik)which immortalizes the event and was often used as a school illustration. If in this painting Columbusunrolls maps, an engraving taken from it, published in theMagasin pittoresque in 1843, shows him standing in front of his examiners, his finger resting on a sphere[21](#21__Les_numeros_de_l_annee_1843). The Council is thus the source of an abundant iconography: it was also painted by Nicolo Barabinoand a representation of it can be found in the archives of the Lisbon Library (Cristovao Colombo no Conselho ne Salamanca[22](#22__Visible_sur_le_site_de_la_Bi)). Finally, many representations of the navigator, including Columbus at the Convent of La Rabida, a painting by Felipe Manso(1492), show him next to a sphere.In particular, this sketch would have to be completed by an investigation of the iconography of schoolbooks from the period 1850-1960, but in any case, the iconography, as we can seeshamelessly exploitsthe myth of Columbus asdiscoverer or at least defender of sphericity

## The Renaissance of Michelet

On this side of the Atlantic, Jules Michelet'sHistoire de France builds in parallel his vision of history.The heroisation of the birth of modern times is not simply a political and intellectual issue: it is also linked to a particular way of writing history, of which Micheletis a good illustration, both by his fiery style and by the way he does not hesitate to twist the truthJacques Le Goff, who has analyzed the evolution of Michelet(he identifies at least three), points out that it took him ten years (from 1833 to 1844) to write the first six volumes of hisHistory of France, in which he gives an enthusiastic description of the first centuries of the Middle Ages, presented as a period when Christianity protected the humble and when "the Church was then the home of the people[23](#23__Michelet__cite_dans_Le_Goff)". It is in the seventh volume, Renaissance (published in 1855), that Michelettackles the period that interests us.In the preface, he claims the right to a history "of original thought, of fruitful initiative, of heroism", in the name of Luther, "who with a No said to the Pope, to the Church, to the Empire, took away half of Europe", but also in the name of Columbus,who belies Rome and the centuries, the councils, the tradition", in the name of Copernicus, who, "against the doctrines and the people, despising at the same time instinct and science, the senses even and thetestimony of the eyes, subordinated the observation to the Reason, and alone conquered the humanity"[24](#24__Michelet__1855__preface___n). This sixteenth century, he then says in the introduction, goes from "Columbusto Copernicus, from Copernicusto Galileo, from the discovery of the Earth to that of the sky[25](#25__Ibid___p__II)". This introduction allows him to paint a black picture of the end of the Middle Ages, and especially of the scientific Middle Ages, which is "worse than nothing", "a shameful retreat".[26](#26__Ibid___p__IX). His reading of the Renaissance is explicit:

Generations too confident in the collective forces that make the greatness of the nineteenth century, come and see the living source where the human race refreshes itself, the source of the soul, which feels that alone it is more than the world and does not wait for the borrowed help of its salvation from its neighbor. The sixteenth century is a hero[27](#27__Ibid___p__IX_X).

This very long introduction concludes with these equally revealing words:

A great movement is going to be made, of war and events, of confused agitations, of vague inspiration. These obscure warnings coming out of the crowds, but little heard by them, someone (Columbus, Copernicusor Luther), will take them for himself, will stand up, will answer: "Here I am!"[28](#28__Ibid___p__CXXXIV).

Micheletsubscribes to the thesis of the oblivion then the return of Antiquity: "the Greek genius guided Columbusand Copernicus.Pythagorasand Philolaüstaught them thesystem of the world.Aristotleguaranteed them the roundness of the Earth[29](#29__Ibid___p__199)". At the very end of the book (which deals with the history of France, let us recall), he returns to the three men mentioned in the introduction, describes these figures of the hero/hero of modern times by underlining their modest origins and their role as founders of a "new church:

Three sons of serfs, heroic workers, cut the three stones on which the new Church was founded: Columbus, Copernicusand Luther. The Italian found the world, and the Pole found the movement, the harmony, the infinity of the sky. The German reconstitutes the family and puts the priesthood in it. It is to found the world of man[30](#30__Ibid___p__310).

This is an avatar of the fascination with the theme of practitioners versus intellectuals, in the form of the humble versus the elite (none of the three are, needless to say, "sons of serfs"). is in the notes to this edition that the link between Columbusand sphericityis made Leaving a chronology determined by French history, Michelet states:

To take the true starting point of the century, it would have been necessary to speak first of the discovery of America [...]. Columbushaving proved the rotundity of the Earth,concluded that it must rotate, as the phases of two planets made one suspect, and as Copernik [sic]proved, [etc.].The discovery of Columbusis the great generative fact of time, the one that had the greatest influence in the long run[31](#31__Ibid___p__315).

CanMicheletignore that at the time of the "Great Discoveries" it is known that the Earth is spherical for nearly 2,000 years but that this does not necessarily imply that it turns?

Jules Michelet's constructions - which must be described as ideological -seem to us today to be far removed from a scientific practice of history (a mild euphemism)They show to what extent the fiction around Columbuswas firmly anchored in the19th century.The mythical figures, praised by Michelet, of the "three sons of serfs" confronting alone the ideological and religious prejudices of their time were taken up again well after himThey were used in numerous history textbooks and popularized works during the20th century, even when academic research began to distance itself from this legend. They also created a diffuse culture, much more difficult to define, which, from Heredia's poem to the metaphors of politicians, wears out the myth of an Earth made flat by religion and of a Middle Ages crushed by ignorance.

## The Galileo Mystery

Let us conclude with a surprising observation:Columbusis one heroic figure, but Galileois another, no less important in our study since it is often he who is spontaneously cited today as the martyr of the round earth, as we recalled to begin withHowever, an examination of the texts contradicts popular sentiment: even the stories in which resentment against the Church is most violently exposed generally avoidcrediting Galileo with the invention of sphericity We will therefore hypothesize here that the transformation of the figure into a hero of resistance to obscurantism, led by intellectuals, facilitated, but only in popular culture, his association with the facile myth of belief in a flat Earth.

Indeed, this transformation of Galileo: the difference in the historical treatment of Copernicusand Galileo is revealing hereHaving never been condemned or questioned during his lifetime, Copernicusis considered a great scientist, but not a martyr Galileo, on the other hand, ispresented in theEncyclopedia as both a pathetic and tragic hero. As early as 1754, volume IV of Diderot and d'AlembertEncyclopédie contains a passage devoted to Galileo, found in the article "Copernicus": to one, the scientific glory of having an entry under his name, but to the other, resistance to the dark forces:

In Italy, it is forbidden to support the system of Copernicus, which is considered contrary to Scripture because of the movement of the Earth that this system supposesThe great Galileowas once placed under the influence of the Inquisition, and his opinion of the movement of the Earth condemned as heretical; the Inquisitors, in the decree they issued against him, did not spare the name of Copernicus[...]Galileo, notwithstanding this censure, having continued to dogmatize on the movement of the Earth, was condemned again, obliged to recant publicly and to abjure his alleged error, by word of mouth and in writing, which he did on June 22, 1633, and having promised on his knees, with his hand on the Gospels, that he would never say or do anythingcontrary to this decree, he was brought back to the prisons of the Inquisition, from which he was soon released[32](#32__Encyclopedie__t__IV__p__174).

If there is no trace of a confusion with the question of sphericity, this article strongly contributed to making the image of the scholar persecuted by the Inquisition a universal one, which could then be adapted to all causes, as Laurent-Henri Vignaudin a recent historiographic review:

pointing out that the attention of commentators, for almost three hundred years, did not focus directly on the conditions of the trial, nor even on Galileo, but rather contributed to the creation of a kind of epinal image in which Science would be at grips with the dragon of obscurantism The victimization of Galileo was born there (and especially in the last century) to serve polemics between ultra-catholics and often anti-clerical scientists[33](#33__Vignaud__2000__SS_13).

# III. REFLECTIONS ON THE GENESIS AND SURVIVAL OF A MYTH

The writings of the three intellectuals of the first half of the 19th century, Irving, Letronneand Humboldtreveal to us, through the abundance of their mutual quotations, the functioning of a research that was certainly internationalized, but in relatively closed circles that we would say today are self-referential.However, these figures are authorities and we can understand how this current of thought was able to installidea that the belief in the flat shape of the Earth was a historical fact But this is not enough to understand the success of this myth, nor its longevity.As we have noted, Galileois not credited by historians or thinkers of the past with having discovered the sphericity of the Earth, unlike Columbus, whereas his name comes up more often in the answers given today to the question "who discovered that the Earth was round?"look at the many websites that have sprung up recently to combat the myth also indicates much more often "No, Galileodid not discover..." than "No, Columbusnot discover that the Earth was round"

The reasons that explain the success of the legend of the flat Earth, and more broadly that of a Church and/or a long Middle Ages obscure and closed to any scientific knowledge, are multiple and sometimes, certainly, more or less underground: the triumph of positivism, a historiography that cultivated a taste for great men, great stories and striking images rather than the truth of the sources, the struggle against clericalism, the strengthening of the young Republic (for France), but also the glorification of the idea of the Renaissance and the overly quick trust placed in the humanists who, the first to designate the Middle Ages as the time of the barbarism of the "Goths", to use a word of Rabelais, as well as the internal quarrels of Christianity from the Reformation onwards, whose role and distant avatars on American soil should not be underestimatedWe must certainly add to this too rapid readings, the confusion of the question of sphericity with that of the movement of the Earth - the first being simpler to apprehend thanthe second -, the imprecision of knowledge which aggravates the problem As we have noted in informal discussions, some colleagues admit to mentioning the question of the flat Earth in their courses when commenting on documents in textbooks, which today, with some exceptions, no longer mention this belief. They think they are doing the right thing by supplementing a textbook that they feel is lacking. We obviously like to believe in this comfortable myth, which allows us to legitimize a linear vision of progress and a simple representation of history, but also certainly endows our era with a sweet feeling of superiority (whereas very few of our contemporaries are capable of understanding a page of medieval philosophy).

If the growing anticlericalism that accompanied the secularization of knowledge and societies is a strong explanatory factor, especially for the nineteenth century, it was indeed probably not only helped, but certainly prepared by two other movements that made its bed. One point that has only been touched upon is that in the eighteenth century, "many Protestant polemicists published pamphlets against the papacy in England, using the example of Galileoas a foil to dogmatic authoritarianism[34](#34__Vignaud__2000)another factor in explaining the virulence of the American attacks, the land of the Pilgrim Fathers who had fled from Catholic persecution (a vision that was also angelic and joyfully Manichean, against which White)In this complex context, the attribution to the Church of the belief in a flat Earth against scientific evidence is astriking image, easy to remember, pedagogically effective and which reinforces the certainties of a civilization which perceives itself as being in clear progress compared to its predecessors

In the same way, the idea of a break between the Middle Ages and the Renaissance or that of a scientific revolution are convenient reference points, but without much meaning. We can in fact underline that, if from the fourteenth century in Italy, a little later in the rest of Europe, intellectuals explicitly defined themselves as breaking with the Middle Ages and used the terms "renaissance" or synonyms (rinascita, rinascenza, restaurazione or risorgimento in Italian, renaissance, restitution or restoration in French, and especially renovatio and restitutio in Latin), it is at the beginning of the XIXth century that the word renaissance (or Rinascimento in Italian) is given a capital letter, to designate not an intellectual movement (the "so happy and desirable renaissance" of the good letters in Belon, in his Observations de plusieurs singularitez of 1553, for example), but an epoch, defined by opposition to a Middle Ages thus rejected in the darkness[35](#35__Pour_une_discussion_historio). If we search for the first occurrences of the term Renaissance in literature (for example, that which has been digitized on Google) with the help of the Ngram Viewer application, we can clearly see that they are situated around 1830 and increase very rapidly throughout the 19th and 20th centuries. In the literary and scientific field, 1828 is the date of publication, in London and New York, of Irvingon Columbusand 1836 ofHumboldtCritical Review.There is at least aconcomitance between the development of the concept of Renaissance in its contemporary form and the thesis of a Middle Ages that would have totally forgotten the science of the Greeks, a thesis that is not found in the preceding works

Indeed, the History of Astronomy written by Jean-Baptiste Delambre, at the very beginning of the19th century, does not mention the disappearance of this science and its achievements during the Middle Ages. The author, an astronomer and mathematician, member of the Academy of Sciences, author of a measurement of the terrestrial meridian, but also a man of letters, Latinist and Hellenist, had read most of the ancient texts that he commented on. In the volume Histoire de l'astronomie au Moyen Âge (published in 1819), he exposes the works of the Arabs, in particular those of Alfraganus(book I), and then those of the Latins, such as theTraité de la Sphère of Jean de Sacrobosco, the treatises of Peuerbach and Regiomontanus, without ever evoking an oblivion of the previous knowledge.Certainly, Delambrementions the loss of the mathematical tools of "the astronomy of the geometers[36](#36__Delambre__Histoire_de_l_astr)This loss will be made up for when the translations of the Arab scholars and the Greek texts transmitted by the latter will reach13th century. But there is no trace of a flattening of the Earth.

However, contemporary reflection on the notion of Renaissance, starting in the nineteenth century and the work of Jacob Burckhardt(The Civilization of the Renaissance in Italy, 1860), in particular, have strongly contributed to making the renovatio perceived in their time by the humanists, a Renaissance, an absolutebetween civilizations. We know today that the continuity between the "Middle Ages" and the "Renaissance" (two periods partly artificially projected, whose dates are not the same everywhere in Europe) is strong, in particular in the academic world through which knowledge is transmitted (which does not mean that it is appropriate to deny the important changes that legitimize the feeling that men of that time had of living in a new era).

In their book on Renaissance philosophy, Brian Copenhaverand Charles Schmittaptly describe how the humanists' appalled descriptions of their scholastic education, and their sarcasm, weighed far more heavily in the construction of the intellectual memory of the Renaissance than the remarkable results and demonstrations of the Aristotelians[37](#37__Copenhaver_et_Schmitt__1992). This overall vision of the torso, maintained by the 19th and 20th centuries, served as a background for a myth such as that of the flat Earth.The black and perfectly unjust vision of the late scholasticism was maintained in particular by a thinker like Descartes.Long before Auguste Comte, he associated in hisPrinciples the idea of childhood with that of spontaneous and unreasoned perception of phenomena:

And because it did not consider yet if the Earth can turn on its axle, and if its surface is curved like that of a ball, it judged at first that it is immobile, and that its surface is flat. And we have been by this means so strongly forewarned of a thousand other prejudices that even when we were able touse our reason well, we received them in our credence[38](#38__Descartes__Principes_I__71B).

One can well imagine how the period that was later called "pre-Cartesian" could thus be associated with a time when men, although "capable of making good use of [their] reason", continued to believe in "prejudices".

The flat Earth is a success, but it should not make us forget that it is only one of the poisoned fruits of a black legend of the Middle Ages, which sometimes includes the Renaissance itself when it comes to university science and philosophy. In the course of one's schooling, at the bend of newspaper articles or books, one may have encountered, for example, the idea that "in the Middle Ages, it was said that women had no soul", "in the Middle Ages, witches were burned", "in the Middle Ages, dissection was forbidden". Recent and older research has, however, challenged two black legends that are of direct interest to us and that seem to us to be quite symptomatic. Bartolomé Bennassarfirst of all, has devoted numerous works to establishing the truth about the history of the Spanish Inquisition, its real doctrine and practice, and the exact number of victimsof his workAnnales magazinein 1981 (forty years ago) rightly pointed out:

The Inquisition, and especially the Spanish Inquisition, is one of the few modern institutions to have becomea myth in the Western consciousnessThe anti-Spanish "black legend", which appeared at the end of thesixteenth century, is undoubtedly one of the first brilliant successes of a propaganda enterprise on an international scale: from Goya to Victor Hugoand Verdi, the images of it remain indelible in collective representations[39](#39__Annales__36_6__1981__p__1079).

He also emphasized the difficulty and the time it had taken for a scientific history to be born, one that does not fall into the dangers of either indictment or apology. It is also the history of the Galileo, which has served to attack the Church or to defend it for centuries, without finally caring too much about either Galileo or the truth

Rafael Mandressihistory of anatomy and dissection is equally salutary In addition to their immense intrinsic interest, they challenge the myth of the medieval ban on dissection:

It has frequently been claimed that opening human corpses in the Middle Ages meant risking excommunication. This was a formidable threat, no doubt, but in reality it was never aimed at anatomists. The only document that could be cited in support of this thesis - "one of our most persistent errors in cultural history", says Louis van Delft - is the decree Detestande feritatis, issued by Pope BonifaceVIII on 27 September 1299is difficult to see how a provision dating from the end of thethirteenth century could have had an effect on the whole of the Middle Ages; moreover, its content did not concern anatomical dissectionsThe decretal certainly proclaimed the pontiff's strong opposition to the dismemberment of corpses, but the "abominable ferocity" the "atrocious custom" to which Bonifaceintended to put an end was that of dismembering the bodies of the deceased in order to facilitate their transport to a burial place far removed from the place of death[40](#40__Mandressi__2003__p__20).

Detestande feritatis played the same role for dissection as Lactantiusfor the flat Earth. At least Lactantius thought the Earth was flat, even if he was the only one or almost the only one. In both cases, the out-of-context manipulation of a single document allows for the blithe falsification of history.

In order to carry out this investigation, we read the studies of our predecessors, but also and above all opened all the sources, ancient or modern, that we could identify. One point struck us, which has probably been little or not underlined until now: the very ancient presence of a strong movement of rejection of the learned elites or of the figure of the expert. The heroes of modern science were not only opposed to a clergy incapable of thinking about anything other than tortuous theological questions and who read nothing but the Bible, and even then in an obtuse way: they were also opposed to the holders of knowledge, to the defenders of abstraction, but also to the powerful. The "sons of serfs" or the "humble navigator" are fictional figures, but they certainly continue to appeal to many of our contemporaries. In the case of Columbusthis figure is spiced with the image of his disgrace, a Columbusdisembarked in Cadiz in chains on his return from his third voyageand died in loneliness and misery, while historical research has shown that he had received very important emoluments, certainly lower than what he expected, but above all that his brief captivity from August to December 1500 was due to the disagreement of the Catholic Monarchs with the bad treatment - torture and enslavement - that the Spanish troops under his command had inflicted on the natives, especially in Haiti, and this from the second voyage[41](#41__Crouzet__2018__p__383_384). The image does not fit well with the romantic figure of the humble pacifist navigator, whether he was a herald of Providence or devoted body and soul to science.

Finally, let's add that we know, in an era where the fight against fake news has become a real issue in a few years, that information responding to a simplistic and Manichean logic spreads much more easily than a more subtle analysis of intellectual or political life. Cognitive biases, intellectual laziness, the need for simple reference points, but also, in our teaching, a long distorted memory transmitted, it must be admitted, by our own institution, the National Education, are probably all to blame. However, the latter bears a very heavy responsibility, for if the majority of history textbooks no longer speak of the myth of the flat Earth, we can also note that none of them takes care to destroy it when the program lends itself to it, which was the case until recently in the baccalaureate questions on cartography or on the Renaissance. In many cases, even, they leave a certain artistic vagueness, which certainly reflects the lack of certainty of their authors.

Notes

[1](#1_6). Comte,Discourses, p. 48.

[2](#2_6). Ibid, p. 65.

[3](#3_6). Ibid, p. 66.

[4](#4_6). Ibid, p. 88.

[5](#5_6). Ibid, editor's note 2, p. 48.

[6](#6_6). Comte, 1st volume of the course, 1830, p. 135.

[7](#7_5). Lecourt, 2004, p. 746.

[8](#8_5). Ibid, p. 747.

[9](#9_5). Proudhon, 1840, p. 7. This statement about Augustine comes fifteen lines after a premonitory sentence: "The preoccupation that results for us from these prejudices is so strong that often, even when we are fighting a principle that our mind judges to be false, that our reason rejects, that our conscience repudiates, we defend it without realizing it, we reason according to it, we obey it by attacking it.

[10](#10_5). BMFFLP, 1892, p. 629.

[11](#11_5). Ibid.

[12](#12_5). Ibid, p. 680.

[13](#13_5). Lalouette, 2002, p. 235

[14](#14_5). Voltaire,Dialogues philosophiques, p. 338.

[15](#15_5). BMFFLP, 1892, p. 630.

[16](#16_5). This is an opportunity to point out that the adjective referring to the Middle Ages is "medieval", and that "medieval" means "which evokes the forms and customs of medieval civilization" and has a pejorative connotation (Centre national de ressources textuelles et lexicales).

[17](#17_5). Krivine, 2011, p. 54

[18](#18_5). White, 1899, p. 53

[19](#19_5). Quoted in Lalouette, 2002, p. 234

[20](#20_5)[. https://fr.wikipedia.org/wiki/Fichier:Christophe\_Colomb\_devant\_le\_conseil\_de\_Salamanque\_-\_Emanuel\_Leutze\_-\_MBA\_Lyon\_2014.jpg](https://fr.wikipedia.org/wiki/Fichier:Christophe_Colomb_devant_le_conseil_de_Salamanque_-_Emanuel_Leutze_-_MBA_Lyon_2014.jpg)

[21](#21_5). The issues of the year 1843 are digitized on Google books, the engraving is on p. 113. One will also read the article which accompanies it.

[22](#22_5). Available on the Biblioteca Nacional Digital website: http:[//purl.pt/6847/3/](http://purl.pt/6847/3/)

[23](#23_5). Michelet, quoted in Le Goff, 1999, p. 33

[24](#24_5). Michelet, 1855, preface, [n.p.].

[25](#25_5). Ibid, p. II.

[26](#26_5). Ibid, p. IX.

[27](#27_5). Ibid. at IX-X.

[28](#28_5). Ibid, p. CXXXIV.

[29](#29_5). Ibid, p. 199.

[30](#30_5). Ibid, p. 310.

[31](#31_5). Ibid, p. 315.

[32](#32_5). Encyclopedia, vol. IV, p. 174.

[33](#33_5). Vignaud, 2000, § 13

[34](#34_5). Vignaud, 2000.

[35](#35_5). a historiographical discussion of the concept, see Jouanna, 2002

[36](#36_5). Delambre,Histoire de l'astronomie ancienne, I, p. XLVI of the preliminary.

[37](#37_5). Copenhaverand Schmitt, 1992, chap. 2

[38](#38_5). Descartes,Principles I, 71B: "That the first and principal cause of our errors are the prejudices of our childhood".

[39](#39_5). Annales, 36/6, 1981, p. 1079.

[40](#40_5). Mandressi, 2003, p. 20

[41](#41_5). Crouzet, 2018, pp. 383-384.

CHAPTER IV

The maintenance of the myth from the 19th to the 20th century: a small selection

The myth of a medieval belief in a flat Earth whose sphericity would have been revealed by the "Great Discoveries" or by the "Scientific Revolution" is reproduced throughout the 20th century. Encyclopedias, novels, films and even scholarly works have continued to maintain this legend to the point that even today, the vast majority of our fellow citizens are convinced that it is an established fact, which they were taught at school. In the most recent back-to-school survey on this subject, a student raised her finger and exclaimed, "But my little brother came home from school last night and told us that the teacher had told him that in the Middle Ages they thought the Earth was flat. And recently, a few discussions in the teachers' lounge proved that the myth was alive and well. We propose to complete this journey with a small compilation that does not claim to be exhaustive (no one is bound to the impossible), but to give sufficiently convincing clues of this massive diffusion and that may also allow us to betterunderstand the actually incomprehensible longevity of this masterful "infox

# I. ACADEMIC VECTORS

Essays and encyclopedias

One finds astonishing statements in a large historical encyclopedia in three volumes, the Histoire générale des peuples de l'Antiquité à nos jours, published in 1926 by Larousse. The presentation on the Renaissance is accompanied by a confusion between the question of the sphericity of the Earth and that of its movement (a confusion that is very common among the general public but surprising in an academic work).Christopher Columbusis presented as the "discoverer" of sphericity and the one who would have prepared the minds for the Copernican revolution:

The discovery of the New World at the end of the 15th century, and the voyage of Magellanat the beginning of the16th century, were to contribute to the renewal of astronomy: a whole unknown part of the Universe was suddenly revealed; the science of books lost its authority before the science of facts; a simple sailor knew much more about the terrestrial globe than Aristotleand Ptolemy.and Magellan opened the way to Nicolas de Copernicus[1](#1__Histoire_generale_des_peuples).

This excerpt is particularly interesting for understanding the survival of the myth: it confirms some clues already encountered. In addition to the author's ignorance, one can especially underline the socio-ideological bias:As Micheletliked to put forward the "sons of serfs" (whereas Columbuswas the son of a weaver well off enough to send him to university and Copernicus, from a rich family of merchants, is a pure product of the renowned Jagiellonian University of Krakow), one can point to the satisfaction the author seems to feel in stating that "a simple sailor knew much more about the terrestrial globe than Aristotleand Ptolemy. This assertion would be laughable if it were not appallingly ignorant, but it may explain the taste for a myth that is also nourished by anti-intellectualism and the presupposition that popular common sense or knowledge acquired through practice is better than all the expert discourse. One can also underline the taste for a history that proceeds by leaps (that one dares not say miraculous): the curtain rises on a new era.

Without going as far as the caricature of Columbusthe way for Copernicus, the thesis of a flat world on the eve of the discoveries was disseminated by essays that can be described as academicAt the end of thetwentieth century (1980), W. G. R. Randels, a historian of ideas, wrote a book in which he intends, right from the title, to assert the existence of an "epistemological mutation" between 1480 and 1520:

On the eve of the Discoveries, and at the very moment of the voyages of Columbus, Vasco de Gamaand Vespucci, none of the five representations of the earth described by Crates, Aristotle, Parmenides(the Zones), Lactantiusand Ptolemyseemed to prevailAlthough they appear to us as incompatible, thefirstfourtend in fact to combine to preserve the paradigm of a flat oecumene, placed on a cosmographic sphere[2](#2__Randels__1980__p__26).

Randelslies in the assertion that the conception of a flat oecumene coexists with that of a spherical sphere, but this very coexistence seems to relativize the assertion of sphericity, since it will only become a certainty for him after the "Great Discoveries" Moreover, he confuses modes of analysis of the Earth that are the result of different disciplines and therefore different modes of representation (cosmography and geography). As for the equivalence between Crates, Aristotle, Parmenides, Lactantiusand Ptolemy, it can only be deliberately and intellectually dishonest: it is useless to go back to the weight of Aristotle (let us note, however, that to consider Aristotle and Lactantius as equivalent amounts to writing a history of the sciences of theXXth century in which the researches of the Paris Observatory, for example, would be put in competition with the horoscope of a women's magazine).

A more serious caricature can be found in the work of a late 20th century historian of science - Daniel BoorstinThe Discoverers - which was published in English in 1983, in French in 1986, republished many times and contributed in its time to the popularization of the history of science.Chapter 14, entitled "The Earth is flat again", aims to demonstrate that, while China was developing an innovative system of terrestrial coordinates, medieval Europe was "sinking into religious cartography" by peddling an "incredible mishmash"fables that would "pepper Christian cartography until the era of the Great Discoveries"Following the now inevitable quotation from Lactantiusagainst the existence of the antipodes, the author asserts that these "fables" were "widely taken up by St. Augustine, St. John Chrysostomand other luminaries of Christianity He summarizes the main one as follows: "antipodes - a place where other men would walk on the opposite feet to ours - it can not be "[3](#3__Boorstin__1994__p__107). We will not return once more to the caricatures of such assertions (the Fathers of the medieval Church as well as the philosophers of the universities would be quite astonished at the incredible glory of Lactantius). Against all historical evidence, Boorstinbrings Isidore, Bedeand Bonifaceinto the circle of flat-earth supporters

Also, to avoid any risk of heresy, good Christians preferred to say that there could be no antipodes, and even, if necessary, that the Earth was not spherical. Saint Augustine, in this respect, is categorical and his immense authority, combined with that of Isidore, Bedethe Venerable, Saint Boniface, etc., will suffice to dissuade reckless minds[4](#4__Ibid___p__107_108).

Heresy is good, and religion encourages ignorance by its illusory certainties: "The main obstacle to the discovery of the shape of the Earth, the continents, the oceans, was not ignorance, but the illusion of knowing[5](#5__Ibid___p__87)". However, Boorstinnot having taken up the "widespread legend" according to which the rejection of Christopher Columbus' projectby a commission of experts was due to "some disagreement as to the shape of the Earth"; he adds that "no cultivated European doubted the sphericity of the Earth"[6](#6__Ibid___p__217).

Let us also mention L'Image du monde, des Babyloniens à Newton, a rather erudite work claiming a scientific approach, which testifies to the diffusion of the myth in the teaching world. The authors assimilate the position of Lactantiusand Cosmasto that of all the Fathers of the Church and, consequently, of the entire medieval period (until the12th century). They dwell, like so many others before them, on the literalist reading of the Bible without demonstrating that it was carried by the Church and the teaching institutions[7](#7__Simaan_et_Fontaine__1999). And for good reason: any investigation, even a quick one, would undermine such an approach. It is difficult to know here whether the authors knowingly manipulate the sources (but what is the point?), or whether intellectual laziness leads them to repeat these assertions without any verification and especially without rigorous analysis of the sources.

An often mentioned bibliographical reference - claimed by the previous authors as "serious and documented" - is Arthur Koestler,Les Somnambules, published in 1955 in English, in 1960 in French and republished several times since. Xavier Campi[8](#8__Campi__2014__p__64) points out that this book was very important in the diffusion of the myth of the Fathers of the Church believing in a flat Earth.Koestler, a British journalist and essayist, had a literary background During the Second World War, he fled Nazi Germany and fought alongside the Spanish Republicans. After being released from a French prison camp, he joined the British Army. This heroic commitment made Koestlera leading figure among many post-war intellectuals, and it was at this time that he decided to take an interest in science, claiming that he wanted to break away from "the silliness of academic barriers", a presupposition reminiscent of the glorification of the "sons of serfs" or the intelligence of sailors

The first part of Les Somnambules, entitled "The Heroic Age," traces the cosmographic systems of Greek antiquity and late antiquity with great lyricism and by magnifying the influence of the Pythagorean school.The second part, as one might expect, announces from its title that what follows is a "dark interlude," which begins with Augustine, whosecentral roleKoestlerconsiders to be "the builder of a bridge" between the old and new worldsHowever, Koestler, "at the granting of theCity of God, they refused any vehicle loaded with the treasures of knowledge[9](#9__Koestler__2010__p__85)However, Koestler points out that "at the granting of the City of God, any vehicle loaded with the treasures of knowledge was refused", conceding all the same that PlatoTimaeus was allowed "to cross" by the bishop of Hippo.This unflattering description precedes an even more negative presentation of the Fathers, of whom "Augustinewas the most enlightened".Lactantiusis obviously castigated for his refusal of the antipodesHe is associated with Jerome, Basil, Severian of Gabalaand CosmasIndicopleustes as the embodiment of a literalist reading of the Bible AboutCosmasChristian Topography, Koestlerstates that it "was the first complete cosmography of the High Middle Ages, intended to replace the teaching of the pagan astronomers". The author implies that the Christian Church adopted the model of theTopography and disseminated it in its schools, which is totally false. He concedes that at the same time and in the same Christianity, "more enlightened" people such as Isidore of Seville and a few others did not defend this model, but asserts that Topography "represents well the image that people had of the Universe at the beginning of the Middle Ages".[10](#10__Ibid___p__89). For the essayist, the light is rekindled only in the IXth century with Bedethe Venerable who "gave back to the Earth its spherical form". But the form of the tabernacle is detected, according to him, until the maps of theXIVth century, without speaking about the maps in OT that he assimilates to maps of geography. The conclusion of this "dark interlude" is provided by Whitehead; Koestlerquotes a passage fromScience and the Modern World, stating that "in 1550, Europe had less knowledge than Archimedeswho died in 212 BC.1550 is of course the date that symbolizes the beginning of the diffusion of the Copernican theses and Koestlercontinues his history of the conceptions of the universe by tracing the biographies of the "sleepwalkers" that were Copernicus, Kepler, Tycho Brahe, Galileoand Newton. Through the struggles of these scientists who succeeded in illuminating the darkness of ancient theories, with advances and setbacks, the author wishes to give a less mechanistic vision of the history of science and its conflict with religions. However, one does not improvise oneself as a historian of science, especially without reading the texts.

The teleological vision of the combat of the heroes of science and truth thus constructed irradiates all the pedagogical productions: the collection of pretty pedagogical volumes that constitute the "Découvertes Gallimard" includes a volume entitled Comment la Terre devint ronde (How the Earth Became Round), which we owe to Jean-Pierre Maury.The work is devoted to ancient thought and concludes with these words, which follow the highly symbolic evocation of the death of Archimedesand the burning of the library of Alexandria:

At the same time, the religious spirit was growing everywhere, in a flowering of bizarre sects, where Greek, Jewish and Persian elements were mixed. From this mixture will eventually emerge Christianity, and the Christians in turn will fight all "pagan" ideas, that is to say all ideas that are not religious. In short, when the Germanic "barbarians" invaded Roman Europe, there would be little left to demolish scientifically... But if science ceased to progress, what it had acquired remained alive, in a dormant state, for fifteen centuries. First preserved by the Byzantines, this small flame will be nourished for a long time by Arab science, and will thus penetrate Spain, then the whole of Southern Europe, in the 13th and 14th centuries. Then came what we now call with a very beautiful name: the Renaissance. One day, Copernicuswill take up astronomy where Aristarchus had left it[11](#11__Maury__1989__p__126).

Even more caricatural is the work of a former Minister of Education - accustomed, it is true, to approximations in the history of science - who intends to denounce the thesis of the flat Earth in the namesecularism, understood as the incompatibility of religion and believers with science It is, according to him, the conclusions of his medievalist historian colleagues that need to be reformed. In a work that we have already mentioned, he undertakes to explain - against academic research - that after the collapse of Rome, the great night of science begins:

Whatever some historians may say, the West then entered a recession from the point of view of knowledge. The faith of the coalman triumphs, the act of warfare is brought to the forefront: the cross and the sword. Is the Christian religion responsible for the burial of Greek science[12](#12__Allegre__1997__p__204) ?

The geochemist, member of the Academy of Sciences, does not hesitate to abandon the question mark to condemn the entire scientific production of the Middle Ages, whose belief in the flat Earth symbolizes this fading of knowledge:

When we take stock of this period from the point of view of scientific innovation, it appears frankly disastrous. No new ideas. No inventions. Neither Rome nor Byzantium, nor the early European Middle Ages, made any significant scientific contribution[13](#13__Ibid___p__204).

dissemination of Allègre- which gathers many stereotypes, peremptory assertions and ideological postulates of this kind - has been anything but confidentialIt has been reprinted many times,translated into Spanish, Italian and Portuguese. It has also been published in paperback.

## Textbooks

The history textbooks of the late nineteenth or twentieth century are not always caricatures, but many betray the historical truth and thus contribute strongly to the propagation of the myth, especially when it comes to primary or secondary school textbooks, which reach the entire population.

The one entitled Histoire de France pour le cours moyen published by M. and S.Chaulangesby Delagrave in 1957, presents the crossing of Columbusas an audacious undertaking, not because of its length, but because at the time only "some scholars claimed that the Earth was not flat, but round like a ball[14](#14__Chaulanges__1957__p__55)". And so Columbusdared to set out westward to reach India. Both authors were normaliens, agrégés, and one can imagine that they had, if not source documents giving a foundation to this legend, at least a secondary literature reproducing it.

Another textbook entitled Histoire 1328-1715, covering the fourth grade curriculum and dating from 1968, written by Abadieand Beaucourt, states in the section describing the progress of navigation that it was "the ancient Greek geography of Ptolemy," translated into Latin in the earlyfifteenth century, that began "to spread the idea that the earth is a sphere.[15](#15__Abadie_et_Beaucourt__1968__p). However, the authors add, this knowledge was still quite vague. Two pageslater, they evoke the enthusiasm generated by the first great expeditions, such as that of Bartolomeu Diaswho succeeded in crossing the Cape of Storms in southern Africa in 1488 on behalf of the King of PortugalFollowing this feat, Christopher Columbus, "convinced of the roundness of the Earth, stimulated by the information gathered in Lisbon[16](#16__Ibid___p__122)"set out westward to reach Asia.

The elementary school history textbooks that were used by today's adults, and even by the youngest among them, are not lagging behind. One can reread thirty years later and word for word, in the chapter on the discoveries of the end of the 15th century, the sentence "Some scholars claimed that the Earth was not flat but round like a ball" in a reprint made in 1985 of the stainless work of M. and S. Chaulangesat Delagrave (renamedL'Histoire au cycle moyen[17](#17__Chaulanges__1985__p__46)). This enormity thus survived thirty years of re-reading by thousands of teachers and inspectors of the National Education! The same year, Nathan published Histoire. La France au fil du temps, de la préhistoire à 1789 pour le CM1, where we read in the chapter on the aforementioned discoveries: "One begins to believe indeed at that time that the Earth is round[18](#18__Vincent__Lochy_et_Semenadiss)". The textbook entitled Histoire CM[19](#19__Bon__Lacoste_et_Lassere__198)published by Belin in 1987, concludes the paragraph on Magellan: "this circumnavigation proves definitively that the Earth is round" Finally,L'Atelier d'histoire, tome 1, cycle 3, published in 2002 by Scolavox, writes in black and: "In 1492, the navigator Christopher Columbusundertook to reach Asia by the west, because he thought that the Earth was round[20](#20__Padelli_et_Hovelaque__2002)". One remains amazed.

Since the question is no longer on the high school curriculum, it is difficult to know what would be written in the textbooks today, but one can have doubts: the 2012 Terminale S program included a question entitled "Representing the World." In the Nathan textbook, in the chapter "Representing the Known World from Antiquity to the Middle Ages," it reads:

In the Middle Ages, religious dogma prevailed over the achievements of Greek science. It was not a question of showing the world as it was, but of representing Creation. Representation thus becomes a tool of proselytizing among others and knowledge fades before the affirmation of beliefs. It does not matter that the world is deformed as long as it arouses faith and wonder[21](#21__Nathan__Histoire_geographie).

If the work no longer perpetuates the idea of the medieval belief in a flat Earth, it remains very ambiguous.

An exploration of other school books reveals that the myth continues to be disseminated outside of history instruction in ways that are as subtle as they are repeated, as shown in this conjugation exercise that asks third graders to associate the past tense phrase "We thought the Earth was flat" with the time indication "in the Middle Ages"[22](#22__Reussir_en_grammaire_CE2__fi). This clandestine infiltration of historical untruths into other disciplinary fields - a sortacademic unconsciousness - is perhaps even more harmful because it is difficult to detect It is again in a French book for CE2 that we found this exercise which proposes to conjugate in the present tense the verbs of this fabulous little text:

In the 1600s, the scientist Galileo(dazzle) the world with his discoveries He (think) about ways to observe the sky. He (deepen) his research and proved that the Earth is round. He (succeed) in demonstrating the movement of the stars[23](#23__Tout_le_francais__CE2__Paris).

In general, it seems that this ambiguity on the question of sphericity, accompanied by a heroisation of the figures of Columbusor Galileoin the academic and scholastic literature of thenineteenth and early twentieth centuries, has left a lasting mark on memories: the transmission of the myth of the flat Earth seems to take place today not only through the many varied remarks of journalists, public men or politicians that we have pointed out, but also through an oral transmission that takes place in primary and secondary schools, at least if we rely on the accounts of students, on the corridor discussions between teachers, the second feeding the first, which accredits the second, and the snake bites its tail.

Beyond the question of the shape of the Earth, the figure of the hero extricating humanity from the limbo of the Middle Ages has indeed been distilled in many ways, whether it be Columbus, Copernicusor Galileo.The text of Micheletwe have quoted, which evokes "men of the calibre of Columbus, Copernicusor Luther, the only ones capable of standing up and saying 'HereIam'", was under study in the volume of the Lagarde et Michard collection on the19th century[24](#24__Lagarde_et_Michard__1963__p)prescribed by the National Education until the beginning of the 1990s. Even with a few critical notes, its content has marked many generations. The practice of a form of heroisation was also common in the way history was written, not only by Irving.

One can also find, at random in the most recent textbooks, a "tutorial sheet" in a history-geography tutorial book for the second grade entitled: "The conception of the Universe: the Church versus science, 16th and 17th centuries[25](#25__Cahier_de_travaux_diriges_d)". In addition to the admirably reductive nature of such a title, one can also consider the questionable way in which the worksheet guides (not to say manipulates) the students' thinking: "By what means does the Church obtain the silence of scientists?", "How did Copernicusescape condemnation?Not to mention the gross scientific errors, since one of the questions tries to get students to say that Galileoused the telescope to prove heliocentrism, which he was in fact incapable of demonstrating: he could only show, by observing the satellites of Jupiter, the possibility that stars revolve around a center other than the EarthExperimental proof of heliocentrism was not provided until 1727 by James Bradleywho, while trying to understand the parallax anomaliescertain stars, discovered the phenomenon of aberration of starlight, which depends on the motion of the Earth

Specialists working today on cognitive biases classify them in several categories, the main one of which seems to be what they call "confirmation bias", i.e. the bias consisting in unconsciously favouring any idea that goes in the direction of the certainties we already have. The myth of the flat Earth confirms a large number of commonplaces that are still widely shared today: the obscurantism of the Middle Ages, the backwardness of the Church, the intrinsic conflict between religion and science, the progress of history by leaps and bounds, the hypertrophied role of heroes who were humble and opposed to the intellectuals of their time... the list is not exhaustive.

# II. CULTURAL VECTORS

Literature and cinema

The cultural vectors of the myth are no less numerous. Columbushimself, first of all, became a literary hero with the19th century, and it would therefore be necessary to systematically go through all the works that put him on stage to know what fate is made to the shape of the Earth. We have not embarked on this systematic investigation, but let us point out that Columbusbecame a hero of novels (Jules Verne, Fenimore Cooper), of theater (a movement that began with Népomucène Mercier, Pixérécourt and Claudel...), and even of opera (Cristoforo Colombo opera by Felicita Casella, created in 1865at the Imperial Theater of Nice). From the18th century, it also gave birth to an epic vein, with for example La Colombiade, ou la foi portée au nouveau monde by Mmedu Bocage (1756) and it was also the subject (among many other works) of a poem that André Chénierdedicated toAmerica.

In the twentieth-centuryliterature that developed around the "Great Discoveries," we also find echoes of the myth.A good example is the novelist Stefan Zweig, who wrote several biographies - often for food reasons, according to his own biographers - including one of Magellan, published in 1938 He evokes the magnitude of the upheaval caused by the first circumnavigation in history with these words:

Now the uncertainty has ended. Doubt, that cruel enemy of all human knowledge, has been defeated in the geographical field. Since a ship left the port of Seville and, going straight ahead, returned to its point of departure, it has been proven that the Earth is a ball and all the seas a single sea. The cosmography of the Greeks and Romans is over; the opposition of the Church and the stupid fables about the antipodes, where men go upside down, are over once and for all. We have definitively established the true shape and extent of the Earth. Other explorers will still be able to make detailed discoveries, which will complete the image that we have of the world, but its fundamental form was given by Magellan[26](#26__Zweig__2009__p__1234).

The novelist evokes, in the last lines of this lyrical biography, the circumference of the terrestrialwhich he seems to ignore that it had been measured since thethird century B.C. This one had been "sought in vain for centuries and centuries" and it is thanks to Magellanthat "humanity discovered its true measure"[27](#27__Ibid___p__1242).

Closer to home, Ridley Scott1492: Christopher Columbus, with Gérard Depardieu in the lead role, has the merit of reproducing fairly faithfully the reservations of the scientists about the feasibility of the Genoese's voyage.The results of Eratosthenesand Ptolemyon the circumference of the Earth give a much higher value than that of Marin of Tyreput forward by Columbusto obtain the support of the authorities However, the caricature of an obscure era is announced in the prologue of the film:

Five hundred years ago, Spain was a nation given over to fear and superstition, under the rule of the Crown and an Inquisition that mercilessly persecuted all who dared to dream. One man defied this power, aware of his destiny.

Columbusis therefore always presented as a hero who confronts the ignorance of his time and, in a rather paradoxical scene, we see him get angry near a globe exclaiming "they told us that it's flat!"

Thus, even when literary works convey a not scientifically false conception of the debates on astronomy, the political and social context surrounding the writing of certain works may have strongly contributed to a distorted or excessive image of an evocation of the past put at the service of the present. sameofBertolt BrechtsbeautifulLife of Galileo: its literary value and its intellectual and moral value in the context of the rise of Nazism are not debatable. Its literal reception, in the context of theseventeenth century, is problematic: it is more than questionable that the Wikipedia page states that "Brechthimself had been placed in a situation historically comparable to what Galileo had experienced", or thatMarianne falls into a simplistic caricature:

It is an astonishing moment when science and crass ignorance, light and darkness, day and night, the critical mind and the submissive brain, pragmatism and stupidity, reality and infox[28](#28__https___www_marianne_net_cul).

Whatever the many reasons why readers or spectators, who cannot be asked to systematically open a medieval astronomy textbook, continue to believe in the myth of the flat Earth, the latter continues to be encountered at every turn, in sentences or novels that have nothing to do with the history of science, or as examples, as in the school textbooks that we mentioned earlier.

We can thus report some surprising discoveries gleaned during an investigation carried out in all directions. example, we still find the flat Earth in a biography of Bernard Giraudeau: "He always loved the dawn. For him, it was the promise of new adventures. That morning, he was like the explorers who, in the15th century, set sailwithout knowing whether the Earth was flat as a disc, at the risk of falling[29](#29__Bertrand_Tessier__Bernard_Gi)". And what about this appearance in Allen'sThe Simple Way to Stop Smoking, which questions the fact that we can be deceived "even about the facts we think are established.Before the discovery of Christopher Columbus, the vast majority of people were convinced that the Earth was flat[30](#30__Allen_Carr__La_Methode_simpl)" ? A delicious illustration of what is believed to be a cognitive bias, such as this example given in a presentation popularizing the theory of paradigms:

Finally, a number of people are making the leap to the new paradigm, enough to gain both psychological and intellectual acceptance. Those who understand the new ideas are no longer as lonely and as rejected as Columbusamong the flat earth believers The new world accepts the new paradigm[31](#31__Richard_Brodie__Le_Virus_de).

Let us quote again this extract from a work which intends precisely to break the myth and thus affirms that Columbusknew that the Earth was spherical:

was Christianity that ended up complicating things and undermining the astronomical data produced by the ancient scientists: in the early Middle Ages,the obscurantism imposed by the Catholic Church made the idea that the Earth was flat prevailBut the contemporaries of Christopher Columbusknew that the Earth was not flat[32](#32__Lydia_Mammar__C_est_vrai_ou).

And it is only the most recent mentions that the digitization allowed us to identify.

Let us simply end this overview with a sketch of an inverted anthology: the exasperation of historians of science with the myth of the flat Earth is now such that a sentence like "Galileonot discover that the Earth was round" has become aleitmotif among those who defend the truth of knowledge.Thus Simone Mazauric, in 2009, wrote that "If Galileo was indeed condemned in 1632 by the Inquisition, it was not, contrary to what a tenacious legend claims that we have already tried to ruin, for having asserted that the Earth was round, but for having disobeyed the injunction that had been served on him to renounce publicly supporting Copernicus' astronomical theory[33](#33__Mazauric__2009__p__76)and Patrick GautierDalché :

I will start with a relatively easy effect, but one that I have no real qualms about using, given the malign force of misconceptions. It concerns the shape of the Earth in the Middle Ages.One still reads serious dissertations that question the dominant conception on this point, and that conclude, as already KeplerorDescartesfighting against Aristotelian scholasticism, that the Middle Ages clung to the idea of a flat EarthFaced with this absurdity, heterodox characters are presented, who would have supported the sphericity of the Earth against the prevailing obscurantism, and who would have been condemned by the Church, prefigurations of Giordano Brunoor Galileo: [...]. I wonder about its vividness and its malignity: what is the reason for the strength of this convenient image of a conformist and stubbornly erroneous Middle Ages, to the point that even specialists propagate it[34](#34__Gautier_Dalche__2001__p__135) ?

All these constructions have been denounced for a long time and the historian Jacques Heersdeplores them in the foreword to his aptly named book,Le Moyen Âge, une imposture. He regrets that about this period "generations of applied pedagogues, authors of manuals of a distressing conformism, of novelists also, take again indefinitely the same stale clichés[35](#35__Heers__2008__p__11)". Among these clichés, those which relate to the role of the Christian Church "agent of obscurantism" are tenacious:

A group of legends has become familiar to us; the prelates and the learned masters of the universities, we are told, persecuted and condemned the men of science, pioneers of free thought, who interpreted the world without recourse to the Holy Scriptures or the Fathers of the Church[36](#36__Ibid___p__272).

Concerning the supposed hostility of the "fossil doctors of the university of Salamanca" to the project ofColumbus, thesis "taken back by the majority of our books", Jacques Heers, specifies:

We are persuaded to see in this confrontation the symbol of a struggle between the clerical obscurantism of the Middle Ages and modern thought... How can one claim or suggest that these scholars or churchmen denied the possibility of arriving in China for those who would go west? Like all good men of their time, they had nothing to learn about the configuration of the Earth; for generations it had been known to be round and it was commonly reasoned in this sense[37](#37__Ibid___p__273).

In addition to the "black legend" we mentioned earlier, to these ideological constructions around the discoveries of Columbusand the supposed resistance of the Church, there is a contempt for medievalist studies, their obscurity and even their uselessness, which we can attest to through our personal experienceThe character imagined by Alain Resnaisin his filmOn connaît la chanson and played by Agnès Jaoui, bears witness to this. What could be more ridiculous than this doctoral student working on "the peasant knights of the year 1000 at Lake Paladru"?What is the point of such work if not "to make idiots talk", as Jaouito Bacri, exasperated by the incomprehension tinged with irony that her work regularly meets?

Notes

[1](#1_7). General History of Peoples from Antiquity to the Present, 1926, vol. 2, p. 56.

[2](#2_7). Randels, 1980, p. 26

[3](#3_7). Boorstin, 1994, p. 107

[4](#4_7). Ibid. , p. 107-108.

[5](#5_7). Ibid, p. 87.

[6](#6_7). Ibid, p. 217.

[7](#7_6). Simaanand Fontaine, 1999.

[8](#8_6). Campi, 2014, p. 64

[9](#9_6). Koestler, 2010, p. 85

[10](#10_6). Ibid, p. 89.

[11](#11_6). Maury, 1989, p. 126

[12](#12_6). Allègre, 1997, p. 204.

[13](#13_6). Ibid, p. 204.

[14](#14_6). Chaulanges, 1957, p. 55

[15](#15_6). Abadieand Beaucourt, 1968, p. 120

[16](#16_6). Ibid, p. 122.

[17](#17_6). Chaulanges, 1985, p. 46

[18](#18_6). Vincent, Lochy and Semenadisse, 1985, p. 90.

[19](#19_6). Bon, Lacoste and Lassère, 1987, p. 51.

[20](#20_6). Padelli and Hovelaque, 2002, p. 45.

[21](#21_6). Nathan, Histoire géographie TS, 2012, p. 154.

[22](#22_6). Réussir en grammaire CE2, fiche 6, Retz, 2014.

[23](#23_6). Tout le français, CE2, Paris, Hatier, 2013, p. 153.

[24](#24_6). Lagarde et Michard, 1963, p. 375.

[25](#25_6). Cahier de travaux dirigés d'histoire-géographie pour classe de seconde, Paris, Hatier, 2000, sheet #10.

[26](#26_6). Zweig, 2009, p. 1234

[27](#27_6). Ibid. , p. 1242.

[28](#28_6)[. https://www.](https://www.marianne.net/culture/theatre-comedie-francaise-galilee-l-homme-qui-n-jamais-capitule)marianne.net/culture/theatre-comedie-francaise-galilee-l-homme-qui-n-jamais-capitule, review on June 12, 2019.

[29](#29_6). Bertrand Tessier, Bernard Giraudeau,le baroudeur romantique, Paris, L'Archipel, 2011, accessed online on 1 November 2019.

[30](#30_6). Allen Carr, The Simple Method to Quit Smoking, numerous editions, here Pockett, 2011, accessed online November 1, 2019).

[31](#31_6). Richard Brodie, The Mind Virus or the New Science of Memes, Paris, Guy Trédaniel, 2015, Introduction, accessed online November 1, 2019.

[32](#32_6). Lydia Mammar,C'est vrai ou c'est faux? 300 mythes fracassés, Paris, L'Opportun, 2015, section "Before Christopher Columbus, everyone thought the Earth was flat."

[33](#33_6). Mazauric, 2009, p. 76

[34](#34_6). GautierDalché, 2001, p. 135-136

[35](#35_6). Heers, 2008, p. 11

[36](#36_6). Ibid. , p. 272.

[37](#37_6). Ibid. , p. 273.

In conclusion

Many of us are surprised by the strength of the myth of the flat Earth. In On Literature, Umberto Ecoanalyzed already several decades ago "The force of the false" taking for example (among others) this same myth, insisting on the fact that "even a first year high school student can easily deduce that, if Danteenters the infernal funnel and comes out on the other side seeing unknown stars at the foot of the mountain of Purgatory, it means that he knew that the Earth was round[1](#1__Eco__2003__p__366)". There is, obviously (as contemporary studies on the comparative speed of the disclosure of false and true news show), a seduction of the false all the more difficult to explain that if one believes in it, it is because one does not know that it is false (M. de La Palice, unfortunate victim of a myth, would say it too). One can therefore, after Eco, continue to wonder about the strength of this myth, which can only be maintained today by a form of extreme intellectual laziness (one onlytype "Flat Earth" on the Net to see that serious sites provide all the information necessary to undermine it) or of absolute bad faith, as Ecowith humor on the subject of the symbolic representations of the sphere: it only takes "a little interpretative goodwill" to understand that a circle, on an illustration or a map, can represent a sphere:

How was it possible that people who believed the Earth to be spherical made maps that showed a flat Earth? The first explanation is that we do it too. To criticize the flatness of these maps would be like criticizing the flatness of our contemporary atlas[2](#2__Ibid___p__369).

Ecotherefore concludes that "false narratives are above all narratives, and narratives, like myths, are always persuasive[3](#3__Ibid___p__393)". In the case of the myth of the flat Earth, however (and probably in others), complex factors are involved, as we have tried to show, starting with an obviously ancestral taste for everything that is similar to conspiracy theories (the Church as a dominating power absolutely wanting to impose an image of the world contrary to reality), but also a form of intellectual comfort consisting not in thinking that "it was better before", but on the contrary that "we" were obviously dumber before, or that we lived in a less free world, or that humanity was still "obscure", all reassuring thoughts that allow us to value the world in which welive, and to value ourselves, by telling ourselves that we belong to a society whose intelligence is collectively superior to that of "before", a notion that is chronologically rather vague (as the Middle Ages or the Renaissance unfortunately still are today) Above all, the history of this myth leads us to question today the social conformism, the intellectual facility and the scholastic conservatism, which perpetuates from generation to generation an information on which it has become very simple to inform oneself.

This point obviously poses difficulties for us teachers. How can we change teaching habits that often persist orally, even though textbooks are beginning to be updated (a little) (with a delay of nearly 2,000 years, therefore...)? Undoubtedly by raising the level of scientific culture of all, and by associating in particular this culture to the learning of science itself. We would like to plead here for the history of science, a difficult discipline, which requires a double approach, both scientific and historical. In France, it exists only in higher education and not yet in all universities. In primary and secondary education, it is conceived as a supplement to the teaching of "hard" sciences, not requiring any particular training. Often reduced to the telling of an anecdote that "completes" or "illustrates" an apprenticeship, the history of science does not have the status of a discipline in the eyes of most of those who distilled the first bits and pieces of it and who shaped the representations of so many generations. Moreover, it does not really allow us to understand, in a reflexive way, how science is built. It has sometimes been disseminated, as we have seen through a fewexamples, by essayists who neglect the tools and methods, no doubt because they think that their mastery of history (Michelet), or of science (Allègre) is enough, or even their lively curiosity for the subject combined with a fine pen (Koestler)

For a long time, therefore, the history of science was made in a teleological manner, by scientists seeking to go back in time to find the premises (and the "precursors") of the results validated later This history of science in the "future past" has prevented the networking of texts, and in particular of theories that were not intended to become scientific truths, thus impoverishing the reading of ancient texts. In addition, the concept of scientific revolution, theorized by Thomas Kuhnas a "paradigm shift" and systematically applied to the period between 1550 and 1650, between Copernicusand Galileopopularized. This had the advantage, despite the very vague contours of the notion of paradigm, of placing the zero point of modern science in the heart of Europe, thus reducing all the previous theses to scholastic stammerings that were supposed to be a prelude to notions... that they ignored by definition. If the research landscape has now largely changed, the reception of the discipline in the academic world and among the general public still bears the scars of these readings.

Without a rigorous approach, a reflection on its object, the history of science quickly becomes "the business of ideology, the stake of battles of influence and mass manipulation", as Patrick Tortabout the interpretation of Darwinian theses[4](#4__Tort__2002__p__28). The problem is even morethorny when the scientific question treated enters into resonance with societal issues such as the separation of Church and State, which animated the end of the19th century, a good part of the 20th century, with resurgences at the beginning of the 21st century.

Without doubt, the teaching of history would also benefit from being less discursive and from being based more systematically on source texts that would be examined critically by teachers first, and then by students. For the preconceived ideas that most people do not question are innumerable.

The constructions that we have tried to unveil are based on a certain conception of progress, associated with an ineluctable development, and of sciences. This conception has its origin from the beginnings of modern science. Galileoannounces inIl Saggiatore (The Essayist), published in 1623, the program of his research based on the idea that natural philosophy "is written in this vast book that is constantly open before our eyes (I mean the Universe), and which [...] is written in mathematical language[5](#5__Galilee__Il_Saggiatore__t__VI)". Michel Blay, in a work of synthesis on the history of sciences, insists on the fact that it will not only be a question, in the works of Galileo which will follow, "of the mathematical setting in order of a nature always identical to itself", but well "of the explicitation of laws [...] of a new idea of nature[6](#6__Blay__2017__p__180). At the end of his work, after having gone through the stages of this mathematization of physics from the 17th to the 18th century, from the analysis ofmotion to differential calculus, and then to the development of a new economic orderhe asks himself: "Is this new idea of nature not, in the end, only a tool for the unlimited development of the 'technique' now confused with it?[7](#7__Ibid___p__214)". It is this conception of nature that leads us to refer the writings and thoughts that precede the 17th century to naïveties that had to be got rid of in order to build our modern world. At a time when the consequences of this limitless development of technology on our oecumene, which has become planetary, are emerging, we have some reasons to question this idea of nature.

The history of science has the merit of allowing an epistemological and philosophical reflection on our own constructions. The myth of the flat Earth is closely linked to this "progressivism" that should therefore be put into perspective: rather than mocking those who, it is thought, believed that the Earth was flat, an interrogation of the deep springs of the myth and what it says about our societies would undoubtedly be salutary. And, to leave the last word to Umberto Eco, "basically, the first duty of the man of culture is that of keeping himself alert to rewrite the encyclopedia every day[8](#8__Eco__2003_____La_force_du_fau)".

Notes

[1](#1_8). Eco, 2003, p. 366.

[2](#2_8). Ibid, p. 369

[3](#3_8). Ibid, p. 393.

[4](#4_8). Tort, 2002, p. 28

[5](#5_8). Galileo,Il Saggiatore, vol. VI, p. 232, quoted and translated by Clavelin, 1996, p. 438

[6](#6_8). Blay, 2017, p. 180

[7](#7_7). Ibid, p. 214.

[8](#8_7). Eco, 2003, "The force of the false", p. 396

APPENDIX

Explanation of the method of Eratosthenesby Cleomedes[1](#1__Nous_utilisons_la_traduction)

Cleomedesprefaces his remarks by saying that in order to understand Eratosthenes, one must admit what he calls "presuppositions". Some of these are related to the cosmographic model used (a spherical Earth, small in relation to the Universe, and very far from the Sun) and others are known geometric properties. These "presuppositions" are summarized in five points:

- Syene and Alexandria are located under the same meridian;

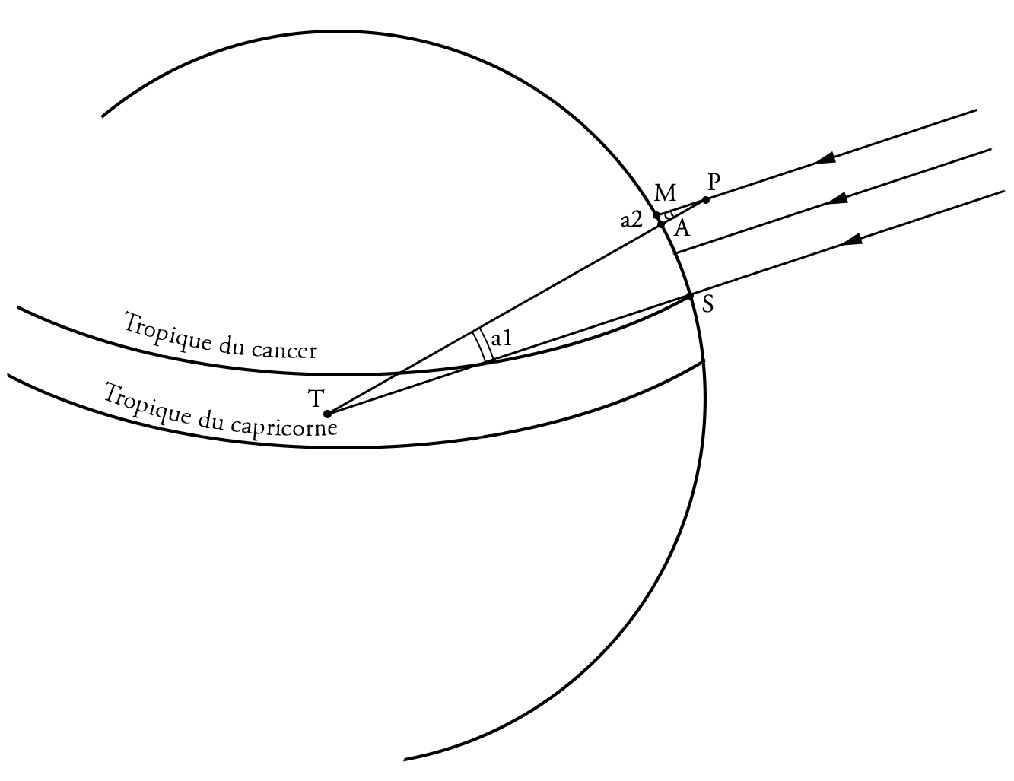
- the distance between the two cities is 5,000 stadia;

- the rays projected from different parts of the sun on different parts of the earth are parallel;

- straight lines that intersect parallel lines produce equal alternate-intercept angles;

- arcs of a circle intercepted by equal angles are similar, i.e. they represent the same portion of the circle.

The steps in Eratosthenes:



- Syene and Alexandria are located "under the same meridian" and the total length of this meridian is the circumference of the Earth itself.

- Syene (S) is located "under the circle of the summer tropic".

- When the Sun is at the summer solstice it passes exactly over the meridian, and the "gnomons of the sundials do not cast any shadow because the Sun is above, exactly vertical".

- In Alexandria (A) at the same time "the gnomons of the sundials cast a shadow, because this city is located further north than Syene".

- The arc of a circle (MA) that goes from the end of the shadow of the gnomon (M) to the very base of the gnomon (A) in Alexandria, is a portion of the meridian.

- The rays of the Earth passing through S and A meet at the center of the Earth (T).

The line drawn by a ray of the Sun falling on Syene and superimposed on the gnomon and the line drawn "from the end of the shadow of the Alexandria gnomon (M) in the direction of the Sun through the tip of the gnomon (P) are parallel" (presupposition 3)

- The line (TA) intersects these parallels forming equal alternate angles a1 and a2.

- a1 is located at the center of the Earth "since it is formed at the meeting point of the straight lines drawn from the gnomons A and S towards the center of the Earth (T)".

- a2 is the angle between the direction of the gnomon (AP) of Alexandria and "the line drawn from the end of its shadow (M) towards the Sun through the point of contact with this gnomon (P)".

- The small arc of a circle (MA) intercepted by a1 "is similar to the arc of a circle (SA) that goes from Syene to Alexandria" intercepted by a2. Now the measure of this angle at the top of the Alexandria gnomon is 1/50th of a circle.

- So the "ratio that exists between the arc of the circle (MA) and the total circle" is the same as the ratio of the arc (SA) which is also "the fiftieth part of the great circle of the earth".

- Now this distance is five thousand stadia.

- "The whole circle is therefore two hundred and fifty thousand stadia".

This result of 250,000 stadia (5,000 x 50) was "rounded" to 252,000 stadia by Eratosthenesto make it divisible by 60 since he had chosen to divide the circle into 60 parts (and not into 360 degrees)

If the stadium of Eratosthenesmeasures 157,5 m as some authors suppose, the result obtained is equivalent to 39 700 km, very close to the 40 075 km measured todayBut if, as other authors affirm (on the basis of the equivalence affirmed by Straboor Plinybetween the length of a stadium and that of 8 Roman miles), the stadium used is the "Attic stadium" of 185 m, then theresult of the Greek mathematician is equivalent to 46 600 km[2](#2__Voir_Engels__1985)which makes a relative difference of approximately 17%. His approach of the order of magnitude of the circumference of the Earth remains remarkable.

Eratosthenescontains several approximations, the first of which is the one he himself assumes by "rounding" the result to 252,000 stadia One may think that this is a thoughtless gesture or one may credit this great scientist with a very keen awareness of the relative imprecision of his measurements. Other sources of error more or less controlled exist:

- Syene and Alexandria are not exactly on the same meridian.

- Syene is not exactly on the tropic but a little north.

- Finally, the distance between Alexandria and Syene was not known with any great precision.

Notes

[1](#1_9). We use the translation of Richard Goulet, in Cléomède,Théorie élémentaire, 2000.

[2](#2_9). See Engels, 1985.

Bibliography

Digital astronomy reference library: http://uranie.huma-num.fr/.

Sacrobosco database: http:[//www.ghtc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm](http://www.ghtc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm)

University database on the sphere: http:[//www.ghtc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm](http://www.ghtc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm)

I. SOURCE TEXTS

1. ANCIENT AND LATE ANTIQUE SOURCES

AMBROISE DE MILAN, Hexameron libri sex, in Patrologiæ cursus completus, series latina, J. P. Migne, Paris, 1844-1960, col. 134-248.

APLEEUS, De mundo, De Platone et eius dogmate and De deo Socratis, in Opuscules philosophiques, trans. J. Beaujeu, Paris, Les Belles Lettres, 1973.

ARISTOTE, Treatise on Heaven; On Generation and Corruption; Meteorologicals, in Complete Works, edited by P. Pellegrin, Flammarion, 2014.

AUGUSTIN OF HIPPONUS, The City of God, translation by G. Combès revised and corrected by G. Madec, Paris, Études augustiniennes, 1993, vol. 3, 4/1 and 4/2.

- La Genèse au sens littéral, trans. P. Agaësse and A. Solignac, Paris, Desclée de Brouwer, 1972.

- Confessions, trans. A. Solignac and M. Skultela, Paris, Études augustiniennes, 1962.

BASIL OF CAESAREA, Homilies on the Hexameron, trans. S. Giet, Paris, Cerf [1949], "Sources chrétiennes", second expanded edition, 1968.

CHALCIDIUS, Timaeus a Calcidio translatus, commentarioque instructus, R. Klibansky, London-Leiden, Warburg Institute, 1962.

CLÉOMÈDE, Théorie élémentaire, trans. R. Goulet, Paris, Vrin [1980], 2000.

COSMAS INDICOPLEUSTES, Christian Topology, 3 vols, ed. and trans. W. Wolska-Conus, Paris, Cerf, 1968.

- Cosmæ Ægyptii monachi Christiana topographia, sive Christianorum opinio de Mundo, ed. and trans. by Bernard de Montfaucon, in Collectio nova patrum et scriptorum Græcorum Eusebii Cæsariensis, Athanasii et Cosmæ ægyptii, Paris, Claude Rigaud, 1707.

DENYS OF ALEXANDRIA, La Description de la terre habitée de Denys d'Alexandrie ou la leçon de géographie, transd. Ch. Jacob, Paris, Albin Michel, 1990.

GRÉGOIRE DE NYSSE, Traité de la création de l'homme, trans. J. Daniélou, Paris, Cerf, 1944.

- In Hexæmeron liber, in Patrologiæ cursus completus, series græca, 44, col. 72 sq.

HIPPARCUS OF NICEA, The Geographical Fragments of Hipparchus, intro. ed. and trans. D. R. Dicks, University of London, The Athlone Press, 1960.

HOMER, Iliad, trans. Paul Mazon, illustrations Léopold Prudon, introduction and notes Paul Mazon, revised by Caroline Noirot, Paris, Les Belles Lettres, 2019.

JEAN PHILOPON, La Création du Monde ou De Opificio Mundi, trans. Marie-Claude Rosset, introduction Marie-Hélène Congourdeau, Paris, Migne, "Les Pères de la foi", 2004.

LACTANCE, Institutions divines, in Choix de monumens primitifs de l'Église chrétienne, Orléans, ed. J. A. Buchon, 1875. <http://remacle.org/bloodwolf/eglise/lactance/table.htm>

LUCRÈCE, De la nature, trans. Alfred Ernout, notes Alfred Ernout, Élisabeth de Fontenay, Paris, Les Belles Lettres, 2019.

MACROBE, Commentary on the Dream of Scipio, trans. Mireille Armisen-Marchetti, Paris, Les Belles Lettres, 2001.

MARTIANUS CAPELLA, The Marriage of Mercury and Philology and the Seven Liberal Arts, trans. A. Dick and J. Préaux, Stuttgart, Teubner, 1983.

ORIGEN, De Principiis, in Patrologiæ cursus completus, series græca, Paris, 1857-1866, vol. 11.dd [?].

PLATO, Timaeus, trans. Luc Brisson, Paris, Garnier Flammarion, 1992.

PLATO, Phaedo, translation, introduction, notes by Monique Dixsaut, Paris, GF Flammarion, 1991.

PLINO, Histoire naturelle, t. 1, trans. Émile Littré, Paris, Firmin-Didot et Cie, 1877. [https://gallica.bnf.fr/ark:/12148/bpt6k2820810?rk=42918;4.](https://gallica.bnf.fr/ark:/12148/bpt6k2820810?rk=42918;4)

PROCLUS, Commentary on the Timaeus, trans. A. J. Festugière, Paris, Vrin, 1966.

SENECUS, Questions naturelles, trans. Paul Oltramare, Paris, Les Belles Lettres, 1929.

STRABON, Geography, trans. Germaine Aujac, Paris, Les Belles Lettres, 1969.

THÉON DE SMYRNE, Reading Plato. Le recours au savoir scientifique : arithmétique, musique, astronomie, ed. and trans. J. Delattre-Biencourt, Toulouse, Anacharsis, 2010.

ARAB SOURCES

AVICENNE (IBN SĪNĀ), Kitāb al- Shifāʾ (The Book of Healing), part two "The Heaven and the World," ed. Ibrahim Madkūr, revision Maḥmūd Qāsim, Cairo, Dār al-kitāb al-ʿarabī, 2012.

FARGHĀNĪ (al), The Book of Celestial Movements and Compendium on the Science of the Stars, translated into Latin and edited bilingually by Jacob Golius, Amsterdam, ed. Johannes Janssonius van Waesberge and Vidua Elizei Weyerstraet,1669, Latin titleAlfraganus, Elementa astronomica, available online at [https://www.wdl.org/fr/item/10687/.](https://www.wdl.org/fr/item/10687/)

IDRĪSĪ (al), Livre du divertissement de celui qui désire traverser les [diverses] contrées, trans. Pierre Amédée Jaubert under the title Géographie d'Édresi, 2 vols, Paris, Imprimerie royale, 1836, online at Gallica as Recueil de voyages et de mémoires published between 1824 and 1866 (volumes 5 and 6).

<https://gallica.bnf.fr/ark:/12148/bpt6k102005m>

<https://gallica.bnf.fr/ark:/12148/bpt6k1020060>

MAÇOUDI, The Book of Warning and Revision, trans. B. Carra de Vaux, Paris, Imprimerie nationale, 1966.

MEDIEVAL SOURCES

ANONYMOUS, The Little Philosophy, an Anglo-Norman, Poem of the XIIIth Century, ed. W. Trethewey, Chicago, The University of Chicago Press, 1935.

ANONYMOUS, Placides et Timeo, ou li secrés as philosophes, ed. Cl. Thomasset, Geneva, Droz, 1980.

BARTHÉLEMY L'ANGLAIS, Libri de proprietatibus rerum, Strasbourg, Georg Husner, 1505.

BEID THE VENERABLE, The Tabernacle, trans. C. Vuillaume, Paris, Cerf, 2003.

BERNARD SILVESTRE, Cosmography, trans. M. Lemoine, Paris, Cerf, 1998.

BOCCACE, Decameron, trans. F. Reynard, Paris, Charpentier et Cie éd., 1884.

BRUNETTO LATINI, Li Livre dou Tresor, Geneva, Slatkine reprints, 1975.

DANTE ALIGHIERI, The Divine Comedy, The Paradise, trans. J. Risset, Paris, GF, 1990.

GOSSUIN DE METZ, L'Image du monde de maître Gossuin de Metz, ed. of the prose by O. H. Prior, Lausanne and Paris, Payot, 1913.

GUILLAUME DE CONCHES, De philosophia mundi libri quattuor (attributed to Honorius Augustodunensis), in Patrologiæ cursus completus, series latina, J. P. Migne, Paris, 1844-1960, 172, coll. 39-102.

..., Dragmaticon philosophiæ summa de philosophia in vulgari, Turnhout, Brepols, 1997.

HILDEGARDE DE BINGEN, Scivias, trans. P. Monat, Paris, Cerf, 1996.

HONORIUS AUGUSTODUNENSIS, De imagine mundi libri tres, in Patrologiæ cursus completus, series latina, 172, col. 119-187.

- Imago mundi, Archives d'histoire doctrinale et littéraire du Moyen Âge, 57, 1982.

ISIDORE DE SEVILLE, De natura rerum, ed. J. Fontaine, Bordeaux, Feret et Fils, 1960.

- Etymologiarium sive Originum libri XX (book XIII), in Patrologiæ cursus completus, series latina, 82, col. 9-728.

JEAN CORBÉCHON, translation of the Book of the Properties of Things by Barthélemy the Englishman, ed. B. Ribémont, Paris, Stock, 1999 (fragments).

JEAN DE MANDEVILLE, Voyage autour de la terre, trans. and comm. C. Deluz, Paris, Les Belles Lettres, 1993.

JOHANNES DE SACROBOSCO, De sphæra liber, Paris, Simon de Colline, 1543.

- Sphera cum commentis contentis videlicet, Venice, Ottaviano Scotto, 1518. <http://uranie.huma-num.fr/idurl/1/1543>

- La Sphere de Jean de Sacrobosco, augmentee de nouveaux commentaires, et figures servant grandement pour l'intelligence d'icelle : le tout mis de latin en françois par Guillaume des Bordes, Paris, Marnef et Cavellat, 1570. <http://uranie.huma-num.fr/idurl/1/1479>

ORESME, Nicole, Book of Heaven and the World, London-Milwaukee, ed. A. D. Menut and A. J. Demony, 1968.

RABAN MAUR, De Universo, Patrologiæ cursus completus, series latina, 112, col. 275-330.

THOMAS OF AQUIN, Summa Theologica, Paris, Cerf, 1997, Ia, qu. 65-75.

- Commentaria in libros aristotelis [...] de Generatione et corruptione, ed. Fretté, volume XXIII, Paris, 1874.

VINCENT DE BEAUVAIS, Speculum maius, Douai, B. Beller, 1624.

SOURCES OF THE LATE MIDDLE AGES AND THE RENAISSANCE

APIAN, Pierre, Cosmographia, Antwerp, Gregorius de Bonte, 1550.

- La Cosmographie, traictant de toutes les régions, pays, villes, et citez du monde [...] trad. de latin en françois par Gemma Frisius, Paris, Vivant Gaultherot, 1553.

CONTARINI, Gasparo, De elementis et eorum mixtionibus libri quinque, Paris, Nicolas Le Riche, 1548.

COLOMB, Christophe, Journal de bord : 1492-1493, trans. S. Estorach and M. Lequenne, Paris, Imprimerie nationale, 1992.

COLOMB, Fernando, La Vie de Cristofle Colomb, et la découverte qu'il a faite des Indes Occidentales, vulgairement appellées le Nouveau Monde, Paris, Cl. Barbin, 1681.

COPERNIC, Nicolas, De revolutionibus orbium cœlestium libri VI, Nuremberg, Johannes Petreius, 1543.

- Des révolutions des orbes célestes, ed. of book I by A. Koyré, Paris, Félix Alcan, 1934.

- Des révolutions des orbes célestes, 3 vols, trans. M.-P. Lerner, A. P. Segonds, J.-P. Verdet, introd. and notes M.-P. Lerner, C. Luna, I. Pantin, D. Savoie, A.P. Segonds, M. Toulmonde, J.-P. Verdet, Paris, Les Belles Lettres, 2015.

CLAVIUS, Christoph, In Sphæram Joanis de Sacrobosco commentarius, Rome, Victor Elian, 1570.

DANEAU, Lambert, La Physique françoise, comprenant treize livres ou traittez, assavoir l'un d'Aristote, onze de Basile et un de Jean Damascène, Genève, Eustache Vignon, 1581.

DE MESMES, Jean-Pierre, Les Institutions astronomiques, Paris, Michel de Vascosan, 1557.

DU BARTAS, Guillaume, La Sepmaine ou Creation du monde, t. I, ed. J. Céard, Paris, Classiques Garnier, 2011.

- La Sepmaine ou Creation du monde, t. II, L'Indice de Simon Goulart, ed. Y Bellenger, Paris, Classiques Garnier, 2011.

DU MONIN, Jean-Édouard, L'Uranologie ou le Ciel, contenant outre l'ordinaire doctrine de la sphære plusieurs beaux discours dignes de tout gentil esprit, Paris, G. Julien, 1583.

FINÉ, Oronce, La Theorique des cielz, mouvements et termes practiques des sept planetes, Paris, Simon Dubois, 1528 [free translation of PEURBACH Georg, Theoricæ novæ planetarum, Paris, Regnault Chaudiere, 1525].

- De mundi Sphæra, sive cosmographia, primave Astronomiæ parte Lib. V [...], Paris, Simon de Colines, 1542.

- La Sphere du monde, properly called cosmography, Paris, Michel de Vascosan, 1551.

GALILEA (GALILEI, Galileo), Dialogo sopra i due massimi sistemi del mondo, [1632]: Dialogue on the two great systems of the world, trans. R. Fréreux, Paris, Seuil, 2000.

- Il Saggiatore, Rome, 1623.

GARNIER, Robert, Hippolyte (1573). La Troade (1579), ed. Jean-Dominique Beaudin, Paris, Classiques Garnier, 2019.

GIRAULT, Simon, Le Globe du monde, contenant un bref traité du Ciel et de la Terre, Langres, J. des Preyz, 1592.

LA POPELINIÈRE, Lancelot VOISIN de, Les Trois Mondes de la Popelinière, ed. A.-M. Beaulieu, Geneva, Droz, 1997.

MEIGRET, Loys, Le Livre du monde faict par Aristote et envoyé à Alexandre le Grand, traduit en françois par Loys Meigret, Paris, J. André,1541.

MELANCHTON, Philip, Initia doctrinæ physicæ, Wittemberg, 1549 and Doctrinæ physicæ elementa sive initia, Lyon, Jean de Tournes and Jean Gazeau, 1552.

PEURBACH, Georg, Theoricæ novæ planetarum, Paris, Regnault Chaudiere, 1525.

PICCOLOMINI, Alessandro, La Prima parte della filosofia naturale, Rome, Vicenzo Valgrisi, 1551.

- La Seconda parte de la filosofia naturale, Venice, Vicenzo Valgrisi, 1554.

- Della sfera del mondo, Venice, s.n., 1540.

- The Sphere of the World, trans. Jacques Goupyl, Paris, Denise Cavellat, 1550 ; Paris, J. de Marnef, 1617.

REISCH, Gregor, Margarita philosophica, Heidelberg, s.n., 1496.

TYARD, Pontus de, L'Univers ou discours des parties et de la nature du monde, Lyon, Jean de Tournes, 1557.

OTHER SOURCES

BMFFLP, Bulletin mensuel de la fédération française de la libre-pensée, year 1892. <https://gallica.bnf.fr/ark:/12148/bpt6k5463926w>

CARPENTIER, Alejo, The Harp and the Shadow, trans. R. Durand, Paris, Gallimard, 1979.

COMTE Auguste, Cours de philosophie positive, tome 1, Paris, Rouen-Frères libraires-éditeurs,1830.

CYRANO DE BERGERAC, Savinien, Les États et Empires du Soleil, Les États et Empires de la Lune [1662], Paris, Gallimard, 2004.

DENIFLE Henri et Châtelain Émile (éd.), Chartularium Universitatis Parisiensis (4 vol.), Paris, 1889-1897.

DELAMBRE, Jean-Baptiste, Histoire de l'astronomie ancienne [Paris 1817], Paris, Jacques Gabay, 2005, 2 vols.

DESCARTES, René, Principes de la philosophie, première partie, new translation by D. Moreau, ed. X. Kieft, Paris, Vrin, 2009.

DIDEROT, Denis, ALEMBERT, Jean D', Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers, t. 1, Paris, Briasson, Le Breton, David et Durant, 1751, Discours préliminaire : <https://gallica.bnf.fr/ark:/12148/bpt6k50533b>

DONNET, Ferdinand-François-Auguste, " Lettre à Sa Sainteté Pie IX pour la prier d'introduire la cause de Christophe Colomb ", in Instructions pastorales. Lettres et discours de son éminence le cardinal-archevêque de Bordeaux sur les principaux objets de la sollicitude pastorale, t. 7 (de 1864 à 1867), Bordeaux, Gounouilhou, 1867.

DRAPER, John William, History of the Conflict between Religion and Science, New York, D. Appleton and Company, 1874.

- Histoire des conflits entre la science et la religion, without name of translator, Paris, Germer Baillière, 1875. <https://gallica.bnf.fr/ark:/12148/bpt6k2013043>

HUMBOLDT, Alexandre VON, Examen critique de l'histoire de la géographie du Nouveau Continent, 5 t. in 3 vols.

IRVING, Washington, A History of the Life and Voyages of Christopher Columbus, London-New York, John Murray G. and C. Carvill, 1828.

- Life and Travels of Christopher Columbus, trans. Defauconpret fils, 4 vols. 2nd ed. Paris, Charles Gosselin, 1828 (digitized on Googlebooks [https://books.google.fr/books?id=y-tRAAAAcAAJ&hl=fr&pg=PA98#v=onepage&q&f=false](https://books.google.fr/books?id=y-tRAAAAcAAJ&hl=fr&pg=PA98" \l "v=onepage&q&f=false)

- and transl. E. Renson, 3 vols, Paris, Lacroix, Verboeckhoven & Cie, Librairie internationale, [1828], 1864.

LETRONNE, Jean-Antoine " Des opinions cosmographiques des Pères de l'Église, rapprochées des doctrines philosophiques de la Grèce ", Revue des deux mondes, initial period, 1, 1834, p. 601-633. https://fr.wikisource.org/wiki/Cosmographie.

MICHELET, Jules, Histoire de France, 17 vols, vol. 7, Paris, Chamerot, 1855. <https://gallica.bnf.fr/ark:/12148/bpt6k6103175f>

MOORE, Thomas, Histoire d'Irlande : d'après Thomas Moore, suivie de l'histoire d'Écosse, d'après Fratzer, et continuée jusqu'à nos jours par Jean Lacroix de Marlès, Paris, Parent-Desbarres, 1840.

PERRAULT, Charles, Parallèle des Anciens et des Modernes en ce qui regarde les Arts et les Sciences, t. 4, Où il est question de l'astronomie, de la géographie, de la navigation, de la guerre, de la philosophie, de la musique, de la médecine etc. Cinquième et dernier dialogue, Paris, Jean-Baptiste Coignard, 1697. [https://gallica.bnf.fr/ark:/12148/bpt6k9795261x](https://gallica.bnf.fr/ark:/12148/bpt6k9795261x )

PROUDHON, Pierre-Joseph, Qu'est-ce que la propriété? ou Recherches sur le principe du droit et du gouvernement, Paris, J.-F. Brocart, 1840. <https://gallica.bnf.fr/ark:/12148/btv1b8626552d>

ROSELLY DE LORGUES, Antoine-François-Félix, Colombus, Histoire de sa vie et de ses voyages, d'après des documents authentiques tirés d'Espagne et d'Italie, t. 1, Paris, Didier et Cie Libraires-éditeurs, 1856 online at Hathy Trust Digital Library <https://hdl.handle.net/2027/nyp.33433081688230>

- Christophe Colomb, Paris, Victor Palmé, 1859.

- 3rd illustrated edition, Paris, V. Palmé, 1887. <https://gallica.bnf.fr/ark:/12148/bpt6k9323815>

VOLTAIRE, Dictionnaire philosophique, vol. III, in Œuvres complètes de Voltaire, Paris, Baudouin Frères, 1826.

- Essais sur les mœurs et l'esprit des nations, vol. IV, in Œuvres complètes de Voltaire, Paris, Baudouin Frères, 1827.

WHITE, Andrew Dickinson, "The Warfare of Science," New York Tribune, 1869. [https://chroniclingamerica.loc.gov/lccn/sn83030214/1869-12-18/ed-1/seq-4/#](https://chroniclingamerica.loc.gov/lccn/sn83030214/1869-12-18/ed-1/seq-4/)

WHITE, Andrew Dickinson, History of the Struggle between Science and Theology, trans. Henri Crosnier de Varigny & G. Adam, Paris, Guillaumin et Cie éditeurs, 1899. <https://gallica.bnf.fr/ark:/12148/bpt6k411710t>

ZWEIG, Stephan, Magellan, in Les Grandes Vies. Fouché, Marie-Antoinette, Marie Stuart, Magellan, Paris, Grasset, 2009.

II. STUDIES

AÏT-TOUATI, Frédérique, Contes de la lune. Essai sur la fiction et la science moderne, Paris, Gallimard, 2011.

ALLÈGRE, Claude, Dieu face à la science, Paris, Seuil, 1997.

ALVERNY, Marie-Thérèse, " Le cosmos symbolique du XIIe siècle ", Archives d'histoire doctrinale et littéraire du Moyen Âge, 1953, p. 31-81.

ARNALDEZ, Roger, "Sciences and Philosophy in the Civilization of Baġdād under the Early ʿAbbāsids," Arabica, 9/3, special volume published on the occasion of the one thousand two hundredth anniversary of the founding of Baghdād, 1962.

AUJAC, Germaine, Claude Ptolémée, astronome, astrologer, geographer. Connaissance et représentations du monde habité, Paris, CTHS, 1993.

ANTÈS, Serge, " Témoignages précarolingiens sur Martianus Capella : Cassiodore, le pseudo-Cassiodore et Grégoire de Tours ", Collection de l'Institut des sciences et techniques de l'Antiquité, 273, 1983, p. 289-297.

BASHET, Jérôme, "Le Journal de bord de Christophe Colomb", in Patrick Boucheron (ed.), Histoire du Monde au XVe siècle, Paris, Fayard, 2009, p. 582-587.

BENNASSAR, Bartolomé, BENNASSAR, Lucile, 1492, Un monde nouveau ? Paris, Perrin, [1991] 2013.

BÉNOT, Yves, "La destruction des indiens de l'aire caraïbe", in Marc Ferro (ed.), Le Livre noir du colonialisme, Paris, Robert Laffont, "Pluriel" [2003] 2010, p. 53-67.

BERETTA, Francesco, LERNER, Michel-Pierre, BIANCHI, Luca, FANTOLI, Annibale, Galileo on trial, Galileo rehabilitated? Paris, Saint-Augustin, 2005.

- In Carlo Longo (ed.), Prædicatores, inquisitores, III, I, Domenicani e l'Inquisizione Romana, Roma, Angelicum University Press, 2008, p. 483-498.

BESSE, Jean-Marc, Les Grandeurs de la Terre. Aspects du savoir géographique à la Renaissance, ENS Éditions, Lyon, 2003.

BIANCHI, Luca, Censorship and Intellectual Freedom at the University of Paris (XIIIe-XIVe siècle), Paris, Les Belles Lettres, 1999.

- and RANDI, Eugenio, Vérités dissonantes. Aristote à la fin du Moyen Âge, Fribourg-Paris, Éd. Universitaires-Éd. du Cerf 1993.

BLAY, Michel, Critique de l'histoire des sciences, Paris, CNRS Éditions, 2017.

BOORSTIN, Daniel, The Discoverers: A History of Man's Search to Know His World and Himself, New York, Random House, 1983.

- Les Découvreurs, trans. J. Bacalu, J. Bodin, B. Vierne, Paris, Robert Laffont [1988] 1994.

BOULNOIS, Olivier, " L'Église gardienne de la culture ", in Jean Duchesne (dir.), Histoire chrétienne de la littérature, Paris, Flammarion, 1998, p. 213-227.

BRAGUE, Rémi, Aristote et la question du monde, Paris, PUF, 1988.

BROWN, Peter, The World of Late Antiquity from Marcus Aurelius to Muhammad, Brussels, Éditions de l'université de Bruxelles, 2011.

BURON, Edmond, Ymago mundi de Pierre d'Ailly, cardinal of Cambrai et chancelier de l'université de Paris (1350-1420) : texte latin et traduction française des quatre traités cosmographiques de d'Ailly et des notes marginales de Christophe Colomb ; étude sur les sources de l'auteur, Paris, Maisonneuve Frères, 1930, 3 vols.

CAMPI, Xavier, La Terre ne tourne pas rond. A history of shapes and movements, Paris, Cassini, 2014.

CHAUNU, Pierre, Le Temps des réformes. Religious history and system of civilization, 2 volumes, Brussels Complexe, 1984.

CLAVELIN, Maurice, La Philosophie naturelle de Galilée, Paris, Albin Michel, 1996.

COMTE, Auguste, Discours sur l'esprit positif, ed. A. Petit, Paris, Vrin, 1995.

CONNOCHIE-BOURGNE, Chantal, Images de la terre dans les Livres de clergie du XIIIe siècle : image du monde, livre du tresor, livre de sydrach, Placides et Timeo, Perspectives médiévales, 24, 1998, p. 67-80.

- In Danielle Buschinger and André Crépin (eds.), Les Quatre Éléments dans la culture médiévale, Göppingen, Kümmerle Verlag, 1983, p. 37-47.

COPENHAVER, Brian and SCHMITT, Charles B., Renaissance Philosophy, Oxford, Oxford University Press, 1992.

CROMBIE, A. C., Histoire de la science de saint Augustin à Galilée, Paris, P.U.F., 1959.

CROUZET, Denis, Christopher Columbus Herald of the Apocalypse, Paris, Payot, 2006 and revised and expanded edition, Paris, PUF, 2018.

DANIÉLOU, Jean, Histoire des doctrines chrétiennes avant Nicée, Paris, Cerf, 1958.

DEFAUX, Olivier, "Les textes géographiques en langue syriaque", in Emilie Villey (ed.) Les Sciences en syriaque, Paris, Librairie orientaliste Paul Geuthner, "Études syriaques" 11, 2014, pp. 107-147.

DELUZ, Christiane, " Une image du monde, la géographie dans l'Occident médiéval, Ve-XVe siècle ", in Patrick GAUTIER DALCHÉ (ed.), La Terre. Connaissance, représentations mesures au Moyen Âge, Turnhout, Brepols, 2013, p. 15-20.

DESCENDRE, Romain, " Mundus Novus ", in Patrick Boucheron (dir.), Histoire du Monde au XVe siècle, Paris, Fayard, 2009, p. 588-593.

DUCHESNE, Jean (ed.), Histoire chrétienne de la littérature. L'esprit des lettres de l'Antiquité à nos jours, Paris, Flammarion, 1996.

DUCOS, Joëlle, La Météorologie en français au Moyen Âge, Paris, Champion, 1998.

DUHEM, Pierre, Le Système du monde. Histoire des doctrines cosmologiques de Platon à Copernic, Paris, Colombier, 1913, t. I, II, III and IX.

DUMONT, Jean-Paul, Les Présocratiques, Paris, Gallimard, 1988 and re-edited, Les Écoles présocratiques, Paris, Gallimard, 1991.

ECO, Umberto, De la littérature, Paris, Le Livre de poche-Grasset, 2003.

ENGELS, Donald, " The Lengh of Eratosthenes' Stade ", The American Journal of Philology, 106/3, Baltimore, The Johns Hopkins University Press, 1985, p. 298-311.

FABRE, Daniel, " Christophe Colomb l'impossible héros ", Terrain, 30. http://journals.openedition.org/terrain/3433.

FONTAINE, Jacques, Isidore de Séville et la culture classique dans l'Europe wisigothique, Paris, Études augustiniennes, 1959.

- Isidore de Séville et la mutation de l'encyclopédisme antique", Cahiers d'histoire mondiale, 9, La Pensée encyclopédique, Neuchâtel, 1966, p. 43-62.

- La Littérature chrétienne tardive, Paris, PUF, 1970.

- Le Monde latin antique et la Bible, Paris, Beauchesne, 1985.

- From Cassiodorus to Isidore: the mutations of the ancient encyclopedism of the VIth to the VIIth century", in Sandro Leanza (dir.), Atti della settimana su Cassiodoro, Rubettino, 1986, p. 72-91.

- The figure of Isidore of Seville in the Carolingian period", in Jacques Fontaine, Christine Pellistrandi (dir.), L'Europe héritière de l'Espagne wisigothique, Paris-Madrid, Casa de Velasquez, 1990, p. 195-211.

- Isidore of Seville. Genesis and originality of the Hispanic culture at the time of the Visigoths, Turnhout, Brepols, 2000.

FONTAINE, Joëlle, SIMAAN, Arkan, L'Image du Monde, des Babyloniens à Newton, Paris, Adapt/Snes-Vuibert, 1999.

GAUTIER DALCHÉ, Patrick (dir.), La Descriptio Mappe Mundi de Hugues de Saint-Victor, Paris, Études augustiniennes, 1988.

- About the antipodes: note on a criterion of authenticity of the Slavonic Vita Constantini", Analecta Bollandiana, 106, 1988, p. 113-119.

- Pour une histoire du regard géographique. Conception et usage de la carte au XVe siecle ", Micrologus, 4, 1996, p. 77-103.

- On the "originality" of "medieval geography", in M. Zimmermann (ed.), Auctor et auctoritas. Invention et conformisme dans l'écriture médiévale, Paris, École des chartes 2001, p. 131-143.

- , "The ancient legacy of medieval cartography: problems and achievements," in R. Talbert, R. W. Unger (eds.), Cartography in Antiquity and the Middle Ages: Fresh Perspectives, New Methods, Leiden, 2008, pp. 29-66.

- La Géographie de Ptolémée en Occident (IVe-XVIe siècle), Turnhout, Brepols, 2009.

- L'Imago mundi de Pierre d'Ailly. 12 août 1410", in Célébrations nationales 2010, p. 152-155.

- , The Earth. Knowledge, representations, measurement in the Middle Ages, Turnhout, Brepols, 2013.

- , "Comment et pourquoi décrire une mappemonde au Moyen Âge?", in P. Chastang, P. Henriet, Cl. Soussen (dir.), Figures de l'autorité médiévale. Mélanges offerts à Michel Zimmermann, Paris, 2016, p. 66-88.

GRANT, Edward, Planets, Stars and Orbs, the Medieval Cosmos, 1200-1687, Cambridge, Cambridge University Press, 1994.

- La Physique au Moyen Âge, Paris, PUF, 1995.

GUTAS, Dimitri, Greek Thought, Arabic Culture. The Greek-Arabic translation movement in Baghdad and early Abbasid society (II-IV/VIII-Xth century), translation of Greek Thought, Arabic Culture, Routledge, 1998; Abdesselam Cheddadi (transl.), Aubier, Paris, 2005.

HEERS, Jacques, Le Moyen Âge, une imposture, Paris, Perrin, [1992] 2008.

JACOB, Christian, La Description de la terre habitée de Denys d'Alexandrie ou la leçon de géographie, Paris, Albin Michel, 1990.

JACOB, François. "Voltaire et Lactance ", in Autour de Lactance : hommages à Pierre Monat, Besançon, Institut des sciences et techniques de l'Antiquité, 2003, p. 53-62.

JOUANNA, Arlette, " La notion de Renaissance : réflexions sur un paradoxe historiographique ", Revue d'histoire moderne et contemporaine, 49-4bis, 2002, p. 5-16.

KEYSER, Paul T., "The Geographical Work of Dikaiarchos", in William W. Fortenbauch, Eckart Schütrumpf (eds.), Dicaearchus of Messana, Text, Translation, and Discussion, New Brunswick-London, Transaction Publishers, "Rutgers University Studies in Classical Humanities" 10, 2001, pp. 353-372.

KOESTLER, Arthur, Les Somnambules, Paris, Les Belles Lettres, 2010.

KRIVINE, Hubert, La Terre. Des mythes au savoir, Paris, Cassini, 2011.

KENNEDY, Edward S., "Mathematical geography and cartography", in R. Rashed (ed.), Histoire des sciences arabes, vol. 1, Paris, Seuil, 1997, pp. 217-232.

LALOUETTE, Jacqueline, La République anticléricale, XIXe-XXe siècle, Paris, Seuil, 2002.

LE BŒUFFLE, André, " L'astronomie de Martianus Capella. Une étape de Platon à Copernic", Revue des études anciennes, 90/1-2, 1988, p. 177-182.

LECOINTRE, Guillaume, " Laïcité des sciences et de l'école face aux créationismes ", Cités, 52, 2012/4, p. 69-84.

LECOURT, Dominique, Dictionnaire d'histoire et philosophie des sciences, Paris, PUF, [1999] 2004.

LE GOFF, Jacques, Un autre Moyen Âge, Paris, Gallimard, "Quarto", 1999.

LERNER, Michel-Pierre, Le Monde des sphères, 2nd revised and enlarged edition, Paris, Les Belles Lettres, 2008.

LIBERA Alain de, La Philosophie médiévale, Paris, PUF, " Que sais-je ? ", 1989.

- La Philosophie médiévale, Paris, PUF, " Quadrige ", [1993] 2004.

LINDBERG, David C., "The Transmission of Greek and Arabic Learning to the West," in David C. Lindberg (ed.), Science in the Middle Ages (Chicago: The University of Chicago Press, 1979), pp. 52-90.

MCELROY, John Harmon, "The Integrity of Irving's Columbus," American Literature 50-1 (1978): 1-16.

MALPANGOTTO, Michela, "The first manuscripts of Georg Peurbach's Theoricæ novæ planetarum: presentation, description, evolution of a work", Revue d'histoire des sciences, 65/2, 2012, pp. 339-380.

MANDRESSI, Rafael, Le Regard de l'anatomiste. Dissections et invention du corps en Occident, Paris, Seuil, 2003.

MARROU, Henri-Irénée, Saint Augustin et la fin de la culture antique, Paris, De Boccard, 1938.

- Histoire de l'éducation dans l'Antiquité, Paris, Seuil, 1965.

MARTIN, Thomas-Henri, " Mémoire sur les hypothèses astronomiques des plus anciens philosophes de la Grèce étrangers à la notion de la sphéricité de la Terre ", in Mémoires de l'Académie des inscriptions et belles-lettres, 29, 2e partie, Paris, Imprimerie nationale, 1878.

MAYAUD, Pierre-Noël, The Conflict between the New Astronomy and the Holy Scripture in the 16th and 17th centuries. Un moment de l'histoire des idées. Autour de l'Affaire Galilée, 6 vols, Paris, Champion, 2005.

MAZAURIC, Simone, " Réception et diffusion du copernicianisme de Copernicus à Galilée ", in Simone Mazauric (ed.), Histoire des sciences à l'époque moderne, Paris, Armand Colin, 2009, p. 76-86.

MICHAUD-QUANTIN, Pierre, " Les petites encyclopédies du XIIIe siècle ", Cahiers d'histoire mondiale, 9, La Pensée encyclopédique, Neuchâtel, 1966, p. 584-588.

MORELON, Régis " L'astronomie arabe orientale (VIIIe-XIe s.) ", in Roshdi Rashed (ed.), Histoire des sciences arabes, vol. I, Paris, Seuil, 1997.

PANTIN, Isabelle, La Poésie du ciel à la Renaissance, Geneva, Droz, 1996.

- , "The First Phases of the Theoricæ Planetarum printed tradition (1474-1535): the Evolution of a Genre Observed Through its Images," Journal for the History of Astronomy 43 (2012): 3-26.

- Oronce Finé, mathématicien et homme du livre : la pratique éditoriale comme moteur d'évolution", in Isabelle Pantin, Gérald Péoux (dir.), Mise en forme des savoirs à la Renaissance. À la croisée des idées, des techniques et des publics, Paris, Armand Colin, p. 19-40.

- Teaching Mathematics and Astronomy in France: the Collège Royal (1550-1650)", Science and Education, 15, 2006, p. 189-207.

- Faux centers, vrais centers, centers multiples : la résistance au décentrement dans les débats des astronomes de la Renaissance", in Frédéric Tinguely (ed.), La Renaissance décentrée, Geneva, Droz, 2008, p. 5-32.

- First repercussions of the "Galileo Affair" in France among philosophers and libertines", in Massimo Bucciantini, Michele Camerota, Franco Giudice (ed.), Il caso Galileo. Una rilettura storica, filosofica, teologica (Florence: Olschki, 2011), pp. 237-258.

PINON, Laurent, " La culture scientifique à Rome au miroir des livres (1527-1650). Apports et limites de l'approche bibliographique", in Antonella Romano (ed.), Rome et la science moderne. Entre Renaissance et Lumières, Rome, École française de Rome, 2009, p. 173-206. <https://books.openedition.org/efr/1907>

PETIT, Maxime (ed.), Histoire générale des peuples de l'Antiquité à nos jours, 3 t., Librairie Larousse, Paris, 1926.

RANDELS, William G. L., De la Terre plate au globe terrestre. Une mutation épistémologique 1480-1520, Paris, Armand Colin, 1980.

RIBÉMONT, Bernard, Les Origines des encyclopédies médiévales, d'Isidore de Séville aux Carolingiens, Paris, Champion, 2001.

- De natura rerum. Études sur les encyclopédies médiévales, Orléans, Paradigme, 1995.

- In Bernard Ribémont (ed.), "Statut de l'astronomie et évolution des connaissances sur le cosmos chez les vulgarisateurs médiévaux : le cas de quelques encyclopédies en langue vernaculaire", in Observer, lire, écrire le ciel au Moyen Âge, Paris, Klincksieck, 1991, p. 283-300.

RICHÉ, Pierre, Éducation et culture dans l'Occident barbare, Paris, Seuil, 1995.

ROLLER, Duane W., Through the Pillars of Herakles: Greco-Roman Exploration of the Atlantic, London, Routledge, 2006.

- Eratosthenes's Geography, Princeton-Oxford, Princeton University Press, 2010.

RUSSEL, Jeffrey Burton, Inventing the Flat Earth: Columbus and Modern Historians, preface by David Noble, New York-London, Westport, Connecticut, Praeger, 1991.

SCHEUCHZER, Jean-Jacques, Physique sacrée ou histoire naturelle de la Bible, translated from the Latin by Jean-Jacques Scheuchzer, volume VII, Amsterdam, Schenk & Mortier, 1735.

SILVI, Christine, " Les "petites encyclopédies" du XIIIe siècle en langue vulgaire ", Le Moyen Âge, CIX-2, 2003, p. 345-361.

TATON, René, La Science moderne de 1450 à 1800, Paris, PUF, [1957] 1994.

TATON, René, Histoire générale des sciences, t. I : La Science antique et médiévale, Paris, PUF, [1958] 1995.

THOMASSET, Claude, Une vision du monde à la fin du XIIIe siècle. Commentaire du dialogue de Placides et Timéo, Geneva, Droz, 1982.

THORNDIKE, Lynn, The Sphere of Sacrobosco and its Commentators, Chicago, The University of Chicago Press, 1949.

TIXIER DU MESNIL, Emmanuelle, " Panorama de la géographie arabe médiévale ", in Henri Brest, Emmanuelle Tixier du Mesnil (dir.), Géographes et voyageurs au Moyen Âge, Paris, Presses universitaires de Paris-Ouest, 2010, p 15 à 28.

TORT, Patrick, The Second Darwinian Revolution, Paris, Eyrolles, 2002.

TRACHSEL, Alexandra, " Le géographe Ératosthène contre Homère : un choix de Strabon ? ", in Christophe Cusset, Hélène Frangoulis (dir.), Eratosthène, un athlète du savoir, Saint-Étienne, Presses universitaires de Saint-Étienne, 2008.

VAGNON, Emmanuelle, " Une géographie pour l'école ? Invention d'un savoir scolaire dans l'Occident latin ", in Éric Vallet, Sandra Aube, Thierry Kouamé (dir.), Lumières de la sagesse : écoles médiévales d'Orient et d'Occident, Paris, Publications de la Sorbonne-Institut du monde arabe, 2013, p. 345-352.

VERGER, Jacques, Culture, enseignement et société en Occident au XIIe et XIIIe siècles, Rennes, PUR, 1999.

- Les Universités françaises au Moyen Âge, Leiden, Brill, 1995.

VIGNAUD, Henry, Histoire critique de la grande entreprise de Christophe Colomb. How he conceived and formed his project, his presentation to different courts, his final acceptance, his execution, his true character, Paris, Welter, 1911, 2 vols.

VIGNAUD, Laurent-Henry, "Galileo: Victim of a Miscarriage of Justice? État de l'historiographie du procès Galilée (1633)", in Benoît Garnot (ed.), Les Victimes, des oubliées de l'histoire? Rennes, Presses universitaires de Rennes, 2000, p. 201-214.

<http://books.openedition.org/pur/18560>

WESLEY, M. Stevens, "The Figure of the Earth in Isidore's De natura rerum", Isis, 71/2, 1980, p. 268-277.

ZIMMERMANN, Klaus, "Eratosthenes's Chlamys-Shaped World: a Misunderstood Metaphor", in Daniel Ogden (ed.), The Hellenistic World, New Perspectives, London, Classical Press of Wales & Duckworth, 2002.

III. TEXTBOOKS AND CHILDREN'S BOOKS

ABADIE, André, BEAUCOURT, Jacques, Histoire 4e, 1328-1715, Paris-Limoges-Nancy, Charles Lavauzelle & Cie, 1968.

BON, François, LACOSTE, Huguette, LASSÈRE Madeleine, Histoire CM, Paris, Belin, 1987.

CHAULANGES, Simone and Martial, Histoire de France cours moyen, Paris, Delagrave, 1957.

CHAULANGES, Simone and Martial, L'Histoire au cycle moyen, Paris, Delagrave, 1985.

LAGARDE, André and MICHARD, Laurent, XIXe siècle, Paris, Bordas, 1963.

MAURY, Jean-Pierre, Comment la Terre devint ronde, Paris, Gallimard, "Découvertes", 1989.

PADELLI, Pascal, HOVELAQUE, Stéphane, L'Atelier d'histoire, tome 1, cycle 3, ed. Emmanuelle Royer, Paris, Scolavox, 2002.

VINCENT, Marc, LOCHY, Jean-Pierre, SÉMÉNADISSE Bernard, Histoire la France au fil du temps de la Préhistoire à 1789, CM1, Paris, Nathan, 1985.

Index of people mentioned

According to the custom, medieval Latin authors are listed by their first name.

Abadie, André[1](#marqIdx_indx_1130) [2](#marqIdx_indx_1408)

Abū al-Barakāt[1](#marqIdx_indx_287)

Adraste[1](#marqIdx_indx_146)

Agaësse, Paul[1](#marqIdx_indx_230) [2](#marqIdx_indx_1263)

Albert Le Grand[1](#marqIdx_indx_374) [2](#marqIdx_indx_429) [3](#marqIdx_indx_669) [4](#marqIdx_indx_676) [5](#marqIdx_indx_799)

Alexandre dAphrodise[1](#marqIdx_indx_34) [2](#marqIdx_indx_282)

Alexandre Neckam[1](#marqIdx_indx_388) [2](#marqIdx_indx_428)

Alfraganus (al-Farghānī)[1](#marqIdx_indx_313) [2](#marqIdx_indx_314) [3](#marqIdx_indx_315) [4](#marqIdx_indx_915) [5](#marqIdx_indx_1035) [6](#marqIdx_indx_1036)

Allègre, Claude[1](#marqIdx_indx_1196) [2](#marqIdx_indx_1126) [3](#marqIdx_indx_1432)

Ambrose of Milan[1](#marqIdx_indx_221) [2](#marqIdx_indx_222) [3](#marqIdx_indx_223) [4](#marqIdx_indx_224) [5](#marqIdx_indx_238) [6](#marqIdx_indx_1260) [7](#marqIdx_indx_406) [8](#marqIdx_indx_647) [9](#marqIdx_indx_663) [10](#marqIdx_indx_694) [11](#marqIdx_indx_864)

Anaxagoras[1](#marqIdx_indx_46) [2](#marqIdx_indx_79) [3](#marqIdx_indx_82)

Anaximander[1](#marqIdx_indx_27) [2](#marqIdx_indx_93) [3](#marqIdx_indx_489)

Anaximenes[1](#marqIdx_indx_78) [2](#marqIdx_indx_81)

Annaud, Jean-Jacques[1](#marqIdx_indx_379)

Antès, Serge[1](#marqIdx_indx_1250)

Apianus Apian, Peter (Peter Bennewitz)[1](#marqIdx_indx_457) [2](#marqIdx_indx_458) [3](#marqIdx_indx_492) [4](#marqIdx_indx_493) [5](#marqIdx_indx_1319) [6](#marqIdx_indx_1320) [7](#marqIdx_indx_1322) [8](#marqIdx_indx_1323) [9](#marqIdx_indx_1326) [10](#marqIdx_indx_1327)

Apuleius[1](#marqIdx_indx_349)

Archimedes[1](#marqIdx_indx_41) [2](#marqIdx_indx_151) [3](#marqIdx_indx_1115) [4](#marqIdx_indx_1124)

Aristophanes[1](#marqIdx_indx_11)

Aristotle[1](#marqIdx_indx_12) [2](#marqIdx_indx_17) [3](#marqIdx_indx_24) [4](#marqIdx_indx_26) [5](#marqIdx_indx_28) [6](#marqIdx_indx_29) [7](#marqIdx_indx_30) [8](#marqIdx_indx_31) [9](#marqIdx_indx_33) [10](#marqIdx_indx_36) [11](#marqIdx_indx_39) [12](#marqIdx_indx_67) [13](#marqIdx_indx_73) [14](#marqIdx_indx_128) [15](#marqIdx_indx_1201) [16](#marqIdx_indx_1202) [17](#marqIdx_indx_1203) [18](#marqIdx_indx_1205) [19](#marqIdx_indx_1207) [20](#marqIdx_indx_1215) [21](#marqIdx_indx_142) [22](#marqIdx_indx_148) [23](#marqIdx_indx_280) [24](#marqIdx_indx_290) [25](#marqIdx_indx_295) [26](#marqIdx_indx_331) [27](#marqIdx_indx_1238) [28](#marqIdx_indx_345) [29](#marqIdx_indx_369) [30](#marqIdx_indx_373) [31](#marqIdx_indx_384) [32](#marqIdx_indx_402) [33](#marqIdx_indx_405) [34](#marqIdx_indx_408) [35](#marqIdx_indx_427) [36](#marqIdx_indx_517) [37](#marqIdx_indx_601) [38](#marqIdx_indx_659) [39](#marqIdx_indx_808) [40](#marqIdx_indx_996) [41](#marqIdx_indx_1057) [42](#marqIdx_indx_1064) [43](#marqIdx_indx_1073) [44](#marqIdx_indx_1079)

Arnaldez, Roger[1](#marqIdx_indx_1273)

Āryabhata[1](#marqIdx_indx_328)

Athanasius[1](#marqIdx_indx_268)

Augustine (saint)[1](#marqIdx_indx_201) [2](#marqIdx_indx_211) [3](#marqIdx_indx_225) [4](#marqIdx_indx_226) [5](#marqIdx_indx_227) [6](#marqIdx_indx_229) [7](#marqIdx_indx_232) [8](#marqIdx_indx_233) [9](#marqIdx_indx_234) [10](#marqIdx_indx_247) [11](#marqIdx_indx_338) [12](#marqIdx_indx_547) [13](#marqIdx_indx_550) [14](#marqIdx_indx_558) [15](#marqIdx_indx_577) [16](#marqIdx_indx_580) [17](#marqIdx_indx_594) [18](#marqIdx_indx_595) [19](#marqIdx_indx_598) [20](#marqIdx_indx_614) [21](#marqIdx_indx_617) [22](#marqIdx_indx_619) [23](#marqIdx_indx_627) [24](#marqIdx_indx_629) [25](#marqIdx_indx_644) [26](#marqIdx_indx_664) [27](#marqIdx_indx_692) [28](#marqIdx_indx_703) [29](#marqIdx_indx_859) [30](#marqIdx_indx_862) [31](#marqIdx_indx_884) [32](#marqIdx_indx_895) [33](#marqIdx_indx_941) [34](#marqIdx_indx_957) [35](#marqIdx_indx_1085) [36](#marqIdx_indx_1089) [37](#marqIdx_indx_1101) [38](#marqIdx_indx_1105)

Aujac, Germaine[1](#marqIdx_indx_124) [2](#marqIdx_indx_1231) [3](#marqIdx_indx_1232)

Aventinus, Johannes[1](#marqIdx_indx_551)

Averroes (Ibn Rushd)[1](#marqIdx_indx_289)

Avicenna (Ibn Sīnā)[1](#marqIdx_indx_286) [2](#marqIdx_indx_292) [3](#marqIdx_indx_293) [4](#marqIdx_indx_310) [5](#marqIdx_indx_1271)

Bacri, Jean-Pierre[1](#marqIdx_indx_1194)

Barabino, Nicolò[1](#marqIdx_indx_971)

Barbey d'Aurevilly, Jules[1](#marqIdx_indx_770)

Barthélemy the Englishman[1](#marqIdx_indx_389) [2](#marqIdx_indx_430)

Bashet, Jérôme[1](#marqIdx_indx_1365)

Basil of Caesarea[1](#marqIdx_indx_208) [2](#marqIdx_indx_210) [3](#marqIdx_indx_216) [4](#marqIdx_indx_217) [5](#marqIdx_indx_218) [6](#marqIdx_indx_220) [7](#marqIdx_indx_237) [8](#marqIdx_indx_262) [9](#marqIdx_indx_265) [10](#marqIdx_indx_1256) [11](#marqIdx_indx_1259) [12](#marqIdx_indx_337) [13](#marqIdx_indx_504) [14](#marqIdx_indx_646) [15](#marqIdx_indx_693) [16](#marqIdx_indx_1107)

Beaucourt, Jacques[1](#marqIdx_indx_1131) [2](#marqIdx_indx_1409)

Bede the Venerable[1](#marqIdx_indx_359) [2](#marqIdx_indx_362) [3](#marqIdx_indx_363) [4](#marqIdx_indx_365) [5](#marqIdx_indx_396) [6](#marqIdx_indx_1283) [7](#marqIdx_indx_1286) [8](#marqIdx_indx_1088) [9](#marqIdx_indx_1090) [10](#marqIdx_indx_1112)

Bennassar, Bartolomé[1](#marqIdx_indx_745) [2](#marqIdx_indx_1358) [3](#marqIdx_indx_1366) [4](#marqIdx_indx_1046)

Bennassar, Lucile[1](#marqIdx_indx_746)

Beretta, Francesco[1](#marqIdx_indx_529) [2](#marqIdx_indx_1334)

Bert, Paul[1](#marqIdx_indx_946) [2](#marqIdx_indx_955)

Berthelot, Marcelin[1](#marqIdx_indx_945) [2](#marqIdx_indx_964)

Besse, Jean-Marc[1](#marqIdx_indx_456) [2](#marqIdx_indx_1310)

Bianchi, Luca[1](#marqIdx_indx_1289)

Bīrūnī (al-)[1](#marqIdx_indx_309) [2](#marqIdx_indx_311) [3](#marqIdx_indx_326) [4](#marqIdx_indx_329)

White, Louis[1](#marqIdx_indx_943)

Blay, Michel[1](#marqIdx_indx_1440) [2](#marqIdx_indx_1422)

Bloy, Léon[1](#marqIdx_indx_756) [2](#marqIdx_indx_767)

Boethius[1](#marqIdx_indx_332) [2](#marqIdx_indx_343) [3](#marqIdx_indx_358) [4](#marqIdx_indx_1282)

Boniface (saint)[1](#marqIdx_indx_553) [2](#marqIdx_indx_561) [3](#marqIdx_indx_1091)

Boniface VIII[1](#marqIdx_indx_1050) [2](#marqIdx_indx_1051)

Boorstin, Daniel[1](#marqIdx_indx_1083) [2](#marqIdx_indx_1087) [3](#marqIdx_indx_1092) [4](#marqIdx_indx_1401)

Boulnois, Olivier[1](#marqIdx_indx_355) [2](#marqIdx_indx_1281) [3](#marqIdx_indx_1293)

Bradley, James[1](#marqIdx_indx_1152)

Brahe, Tycho[1](#marqIdx_indx_513) [2](#marqIdx_indx_514) [3](#marqIdx_indx_1119) [4](#marqIdx_indx_1120)

Brecht, Bertold[1](#marqIdx_indx_1172) [2](#marqIdx_indx_1173)

Brown, Peter[1](#marqIdx_indx_1268) [2](#marqIdx_indx_341) [3](#marqIdx_indx_1279)

Brunetto Latini[1](#marqIdx_indx_393) [2](#marqIdx_indx_424)

Bruno, Giordano[1](#marqIdx_indx_1150) [2](#marqIdx_indx_1185)

Buffon, Georges-Louis Leclerc de[1](#marqIdx_indx_723)

Burckhardt, Jacob[1](#marqIdx_indx_1041)

Burnet, Thomas[1](#marqIdx_indx_713) [2](#marqIdx_indx_717)

Calvin, John[1](#marqIdx_indx_673)

Campi, Xavier[1](#marqIdx_indx_926) [2](#marqIdx_indx_1379) [3](#marqIdx_indx_1098) [4](#marqIdx_indx_1404)

Carpentier, Alejo[1](#marqIdx_indx_773)

Casella, Felicita[1](#marqIdx_indx_1157)

Cassiodore[1](#marqIdx_indx_182) [2](#marqIdx_indx_356) [3](#marqIdx_indx_435)

Cecco d'Ascoli[1](#marqIdx_indx_679)

Chalcidius[1](#marqIdx_indx_153) [2](#marqIdx_indx_168) [3](#marqIdx_indx_188) [4](#marqIdx_indx_353) [5](#marqIdx_indx_404)

Charlemagne[1](#marqIdx_indx_407)

Chaulanges, Simone and Martial[1](#marqIdx_indx_1127) [2](#marqIdx_indx_1135) [3](#marqIdx_indx_1407) [4](#marqIdx_indx_1410)

Chénier, André[1](#marqIdx_indx_1159)

Cicero[1](#marqIdx_indx_159) [2](#marqIdx_indx_203) [3](#marqIdx_indx_348)

Clavelin, Maurice[1](#marqIdx_indx_1421)

Clavius, Christophe[1](#marqIdx_indx_412)

Clemenceau, Georges[1](#marqIdx_indx_944)

Cleomedes[1](#marqIdx_indx_43) [2](#marqIdx_indx_49) [3](#marqIdx_indx_86) [4](#marqIdx_indx_92) [5](#marqIdx_indx_1209) [6](#marqIdx_indx_1218) [7](#marqIdx_indx_1220) [8](#marqIdx_indx_144) [9](#marqIdx_indx_1443) [10](#marqIdx_indx_1444) [11](#marqIdx_indx_1424)

Columbus, Christopher[1](#marqIdx_indx_8) [2](#marqIdx_indx_14) [3](#marqIdx_indx_57) [4](#marqIdx_indx_305) [5](#marqIdx_indx_321) [6](#marqIdx_indx_447) [7](#marqIdx_indx_462) [8](#marqIdx_indx_465) [9](#marqIdx_indx_501) [10](#marqIdx_indx_534) [11](#marqIdx_indx_535) [12](#marqIdx_indx_536) [13](#marqIdx_indx_578) [14](#marqIdx_indx_581) [15](#marqIdx_indx_609) [16](#marqIdx_indx_622) [17](#marqIdx_indx_623) [18](#marqIdx_indx_634) [19](#marqIdx_indx_640) [20](#marqIdx_indx_642) [21](#marqIdx_indx_684) [22](#marqIdx_indx_730) [23](#marqIdx_indx_732) [24](#marqIdx_indx_733) [25](#marqIdx_indx_734) [26](#marqIdx_indx_737) [27](#marqIdx_indx_738) [28](#marqIdx_indx_742) [29](#marqIdx_indx_747) [30](#marqIdx_indx_748) [31](#marqIdx_indx_749) [32](#marqIdx_indx_751) [33](#marqIdx_indx_754) [34](#marqIdx_indx_759) [35](#marqIdx_indx_760) [36](#marqIdx_indx_761) [37](#marqIdx_indx_764) [38](#marqIdx_indx_766) [39](#marqIdx_indx_769) [40](#marqIdx_indx_772) [41](#marqIdx_indx_775) [42](#marqIdx_indx_779) [43](#marqIdx_indx_781) [44](#marqIdx_indx_783) [45](#marqIdx_indx_787) [46](#marqIdx_indx_790) [47](#marqIdx_indx_792) [48](#marqIdx_indx_795) [49](#marqIdx_indx_796) [50](#marqIdx_indx_801) [51](#marqIdx_indx_804) [52](#marqIdx_indx_806) [53](#marqIdx_indx_812) [54](#marqIdx_indx_813) [55](#marqIdx_indx_814) [56](#marqIdx_indx_816) [57](#marqIdx_indx_818) [58](#marqIdx_indx_820) [59](#marqIdx_indx_824) [60](#marqIdx_indx_825) [61](#marqIdx_indx_826) [62](#marqIdx_indx_827) [63](#marqIdx_indx_828) [64](#marqIdx_indx_833) [65](#marqIdx_indx_838) [66](#marqIdx_indx_846) [67](#marqIdx_indx_850) [68](#marqIdx_indx_852) [69](#marqIdx_indx_855) [70](#marqIdx_indx_860) [71](#marqIdx_indx_868) [72](#marqIdx_indx_869) [73](#marqIdx_indx_874) [74](#marqIdx_indx_878) [75](#marqIdx_indx_880) [76](#marqIdx_indx_882) [77](#marqIdx_indx_886) [78](#marqIdx_indx_890) [79](#marqIdx_indx_893) [80](#marqIdx_indx_898) [81](#marqIdx_indx_899) [82](#marqIdx_indx_901) [83](#marqIdx_indx_904) [84](#marqIdx_indx_905) [85](#marqIdx_indx_911) [86](#marqIdx_indx_912) [87](#marqIdx_indx_917) [88](#marqIdx_indx_919) [89](#marqIdx_indx_922) [90](#marqIdx_indx_924) [91](#marqIdx_indx_925) [92](#marqIdx_indx_928) [93](#marqIdx_indx_929) [94](#marqIdx_indx_1369) [95](#marqIdx_indx_1370) [96](#marqIdx_indx_1378) [97](#marqIdx_indx_932) [98](#marqIdx_indx_938) [99](#marqIdx_indx_949) [100](#marqIdx_indx_950) [101](#marqIdx_indx_951) [102](#marqIdx_indx_953) [103](#marqIdx_indx_966) [104](#marqIdx_indx_967) [105](#marqIdx_indx_968) [106](#marqIdx_indx_970) [107](#marqIdx_indx_972) [108](#marqIdx_indx_974) [109](#marqIdx_indx_982) [110](#marqIdx_indx_984) [111](#marqIdx_indx_988) [112](#marqIdx_indx_992) [113](#marqIdx_indx_997) [114](#marqIdx_indx_1000) [115](#marqIdx_indx_1001) [116](#marqIdx_indx_1002) [117](#marqIdx_indx_1005) [118](#marqIdx_indx_1008) [119](#marqIdx_indx_1024) [120](#marqIdx_indx_1027) [121](#marqIdx_indx_1032) [122](#marqIdx_indx_1053) [123](#marqIdx_indx_1054) [124](#marqIdx_indx_1055) [125](#marqIdx_indx_1059) [126](#marqIdx_indx_1062) [127](#marqIdx_indx_1066) [128](#marqIdx_indx_1069) [129](#marqIdx_indx_1093) [130](#marqIdx_indx_1128) [131](#marqIdx_indx_1129) [132](#marqIdx_indx_1134) [133](#marqIdx_indx_1137) [134](#marqIdx_indx_1139) [135](#marqIdx_indx_1141) [136](#marqIdx_indx_1145) [137](#marqIdx_indx_1153) [138](#marqIdx_indx_1154) [139](#marqIdx_indx_1165) [140](#marqIdx_indx_1169) [141](#marqIdx_indx_1170) [142](#marqIdx_indx_1175) [143](#marqIdx_indx_1176) [144](#marqIdx_indx_1177) [145](#marqIdx_indx_1178) [146](#marqIdx_indx_1188) [147](#marqIdx_indx_1190) [148](#marqIdx_indx_1414)

Columbus, Fernando[1](#marqIdx_indx_835) [2](#marqIdx_indx_836) [3](#marqIdx_indx_872) [4](#marqIdx_indx_873) [5](#marqIdx_indx_875) [6](#marqIdx_indx_908) [7](#marqIdx_indx_910)

Count, Auguste[1](#marqIdx_indx_933) [2](#marqIdx_indx_934) [3](#marqIdx_indx_935) [4](#marqIdx_indx_936) [5](#marqIdx_indx_937) [6](#marqIdx_indx_939) [7](#marqIdx_indx_952) [8](#marqIdx_indx_1045) [9](#marqIdx_indx_1380) [10](#marqIdx_indx_1381)

Constantin[1](#marqIdx_indx_200) [2](#marqIdx_indx_342)

Cooper, Fenimore[1](#marqIdx_indx_847) [2](#marqIdx_indx_1156)

Copenhaver, Brian[1](#marqIdx_indx_1042) [2](#marqIdx_indx_1395)

Copernicus, Nicholas[1](#marqIdx_indx_7) [2](#marqIdx_indx_10) [3](#marqIdx_indx_177) [4](#marqIdx_indx_1249) [5](#marqIdx_indx_431) [6](#marqIdx_indx_463) [7](#marqIdx_indx_466) [8](#marqIdx_indx_511) [9](#marqIdx_indx_522) [10](#marqIdx_indx_525) [11](#marqIdx_indx_542) [12](#marqIdx_indx_545) [13](#marqIdx_indx_674) [14](#marqIdx_indx_682) [15](#marqIdx_indx_685) [16](#marqIdx_indx_1336) [17](#marqIdx_indx_740) [18](#marqIdx_indx_1356) [19](#marqIdx_indx_983) [20](#marqIdx_indx_985) [21](#marqIdx_indx_986) [22](#marqIdx_indx_989) [23](#marqIdx_indx_993) [24](#marqIdx_indx_998) [25](#marqIdx_indx_1011) [26](#marqIdx_indx_1012) [27](#marqIdx_indx_1014) [28](#marqIdx_indx_1015) [29](#marqIdx_indx_1017) [30](#marqIdx_indx_1060) [31](#marqIdx_indx_1063) [32](#marqIdx_indx_1067) [33](#marqIdx_indx_1117) [34](#marqIdx_indx_1125) [35](#marqIdx_indx_1142) [36](#marqIdx_indx_1146) [37](#marqIdx_indx_1149) [38](#marqIdx_indx_1181) [39](#marqIdx_indx_1436)

Cosmas Indicopleustes[1](#marqIdx_indx_254) [2](#marqIdx_indx_256) [3](#marqIdx_indx_257) [4](#marqIdx_indx_258) [5](#marqIdx_indx_259) [6](#marqIdx_indx_333) [7](#marqIdx_indx_334) [8](#marqIdx_indx_336) [9](#marqIdx_indx_1269) [10](#marqIdx_indx_350) [11](#marqIdx_indx_364) [12](#marqIdx_indx_582) [13](#marqIdx_indx_584) [14](#marqIdx_indx_586) [15](#marqIdx_indx_587) [16](#marqIdx_indx_604) [17](#marqIdx_indx_608) [18](#marqIdx_indx_632) [19](#marqIdx_indx_660) [20](#marqIdx_indx_662) [21](#marqIdx_indx_689) [22](#marqIdx_indx_700) [23](#marqIdx_indx_708) [24](#marqIdx_indx_1096) [25](#marqIdx_indx_1109) [26](#marqIdx_indx_1110)

Cratès of Milos[1](#marqIdx_indx_162) [2](#marqIdx_indx_1072) [3](#marqIdx_indx_1078)

Crouzet, Denis[1](#marqIdx_indx_1349) [2](#marqIdx_indx_916) [3](#marqIdx_indx_1354) [4](#marqIdx_indx_1374) [5](#marqIdx_indx_1376) [6](#marqIdx_indx_1399)

Cyrano de Bergerac[1](#marqIdx_indx_616) [2](#marqIdx_indx_1345)

DAlembert, Jean le Rond[1](#marqIdx_indx_576) [2](#marqIdx_indx_615) [3](#marqIdx_indx_1013)

Dante Alighieri[1](#marqIdx_indx_395) [2](#marqIdx_indx_1297) [3](#marqIdx_indx_1427)

Darwin, Charles[1](#marqIdx_indx_959) [2](#marqIdx_indx_960)

Delambre, Jean-Baptiste[1](#marqIdx_indx_1034) [2](#marqIdx_indx_1039) [3](#marqIdx_indx_1394)

Delattre-Biencourt, Joëlle[1](#marqIdx_indx_133) [2](#marqIdx_indx_135) [3](#marqIdx_indx_1233) [4](#marqIdx_indx_1241)

Deluc, Jean André[1](#marqIdx_indx_716) [2](#marqIdx_indx_720)

Deluz, Christiane[1](#marqIdx_indx_448) [2](#marqIdx_indx_1295) [3](#marqIdx_indx_1305) [4](#marqIdx_indx_1306)

De Mesmes, Jean-Pierre[1](#marqIdx_indx_483) [2](#marqIdx_indx_484) [3](#marqIdx_indx_485) [4](#marqIdx_indx_486) [5](#marqIdx_indx_1317) [6](#marqIdx_indx_1318)

Democritus[1](#marqIdx_indx_80) [2](#marqIdx_indx_83) [3](#marqIdx_indx_490)

Dionysius of Alexandria[1](#marqIdx_indx_108) [2](#marqIdx_indx_115) [3](#marqIdx_indx_116) [4](#marqIdx_indx_1230)

Dercyllide[1](#marqIdx_indx_141)

Des Bordes, Guillaume[1](#marqIdx_indx_420) [2](#marqIdx_indx_421) [3](#marqIdx_indx_1301)

Descartes, René[1](#marqIdx_indx_527) [2](#marqIdx_indx_1044) [3](#marqIdx_indx_1397) [4](#marqIdx_indx_1184)

Go down, Roman[1](#marqIdx_indx_1357)

Detienne, Marcel[1](#marqIdx_indx_114) [2](#marqIdx_indx_1229)

Deza, Diego[1](#marqIdx_indx_856)

Dias Bartolomeu[1](#marqIdx_indx_1133)

Dicearch of Messina[1](#marqIdx_indx_40) [2](#marqIdx_indx_59) [3](#marqIdx_indx_88) [4](#marqIdx_indx_95) [5](#marqIdx_indx_96)

Dicks, David Reginald[1](#marqIdx_indx_1210)

Diodorus of Tarsus[1](#marqIdx_indx_241) [2](#marqIdx_indx_698)

Diogenes Laërce[1](#marqIdx_indx_70) [2](#marqIdx_indx_74)

Donnet, Ferdinand[1](#marqIdx_indx_750) [2](#marqIdx_indx_753) [3](#marqIdx_indx_763) [4](#marqIdx_indx_1360)

Draper, John William[1](#marqIdx_indx_20) [2](#marqIdx_indx_624) [3](#marqIdx_indx_625) [4](#marqIdx_indx_626) [5](#marqIdx_indx_628) [6](#marqIdx_indx_630) [7](#marqIdx_indx_637) [8](#marqIdx_indx_649) [9](#marqIdx_indx_654) [10](#marqIdx_indx_655) [11](#marqIdx_indx_657) [12](#marqIdx_indx_667) [13](#marqIdx_indx_711) [14](#marqIdx_indx_1348) [15](#marqIdx_indx_1350) [16](#marqIdx_indx_845) [17](#marqIdx_indx_958)

Du Bartas, Guillaume[1](#marqIdx_indx_497) [2](#marqIdx_indx_498) [3](#marqIdx_indx_499) [4](#marqIdx_indx_500) [5](#marqIdx_indx_502) [6](#marqIdx_indx_503) [7](#marqIdx_indx_508) [8](#marqIdx_indx_509) [9](#marqIdx_indx_1329) [10](#marqIdx_indx_1330)

Du Bocage, Anne-Marie[1](#marqIdx_indx_1158)

Ducos, Joëlle[1](#marqIdx_indx_1291)

Duhem, Pierre[1](#marqIdx_indx_1206) [2](#marqIdx_indx_163) [3](#marqIdx_indx_1246) [4](#marqIdx_indx_1255) [5](#marqIdx_indx_1257)

Eco, Umberto[1](#marqIdx_indx_335) [2](#marqIdx_indx_1278) [3](#marqIdx_indx_380) [4](#marqIdx_indx_1426) [5](#marqIdx_indx_1428) [6](#marqIdx_indx_1429) [7](#marqIdx_indx_1430) [8](#marqIdx_indx_1441) [9](#marqIdx_indx_1418) [10](#marqIdx_indx_1423)

Empedocles[1](#marqIdx_indx_491)

Engels, Donald[1](#marqIdx_indx_1425)

Eratosthenes[1](#marqIdx_indx_1) [2](#marqIdx_indx_13) [3](#marqIdx_indx_37) [4](#marqIdx_indx_42) [5](#marqIdx_indx_44) [6](#marqIdx_indx_47) [7](#marqIdx_indx_63) [8](#marqIdx_indx_68) [9](#marqIdx_indx_85) [10](#marqIdx_indx_87) [11](#marqIdx_indx_97) [12](#marqIdx_indx_103) [13](#marqIdx_indx_104) [14](#marqIdx_indx_110) [15](#marqIdx_indx_119) [16](#marqIdx_indx_1228) [17](#marqIdx_indx_139) [18](#marqIdx_indx_150) [19](#marqIdx_indx_272) [20](#marqIdx_indx_302) [21](#marqIdx_indx_340) [22](#marqIdx_indx_602) [23](#marqIdx_indx_1166) [24](#marqIdx_indx_1442) [25](#marqIdx_indx_1445) [26](#marqIdx_indx_1446) [27](#marqIdx_indx_1447) [28](#marqIdx_indx_1448) [29](#marqIdx_indx_1451)

Étienne Tempier[1](#marqIdx_indx_378)

Eudoxus of Cnidus[1](#marqIdx_indx_38) [2](#marqIdx_indx_94)

Euripides[1](#marqIdx_indx_506)

Euthymen[1](#marqIdx_indx_62)

Fabre, Daniel[1](#marqIdx_indx_752) [2](#marqIdx_indx_757) [3](#marqIdx_indx_1359)

Fārābī (al-)[1](#marqIdx_indx_285)

Finé, Oronce[1](#marqIdx_indx_411) [2](#marqIdx_indx_416) [3](#marqIdx_indx_477) [4](#marqIdx_indx_478) [5](#marqIdx_indx_479) [6](#marqIdx_indx_481) [7](#marqIdx_indx_482) [8](#marqIdx_indx_1315) [9](#marqIdx_indx_1316)

Fontaine, Jacques[1](#marqIdx_indx_400) [2](#marqIdx_indx_1298) [3](#marqIdx_indx_1299)

Fontaine, Joëlle[1](#marqIdx_indx_1403)

Fracastoro, Girolamo[1](#marqIdx_indx_512)

Galam, Serge[1](#marqIdx_indx_1197)

Galileo (Galileo Galilei)[1](#marqIdx_indx_2) [2](#marqIdx_indx_4) [3](#marqIdx_indx_5) [4](#marqIdx_indx_6) [5](#marqIdx_indx_15) [6](#marqIdx_indx_330) [7](#marqIdx_indx_464) [8](#marqIdx_indx_467) [9](#marqIdx_indx_510) [10](#marqIdx_indx_515) [11](#marqIdx_indx_526) [12](#marqIdx_indx_528) [13](#marqIdx_indx_530) [14](#marqIdx_indx_531) [15](#marqIdx_indx_533) [16](#marqIdx_indx_565) [17](#marqIdx_indx_575) [18](#marqIdx_indx_620) [19](#marqIdx_indx_681) [20](#marqIdx_indx_729) [21](#marqIdx_indx_891) [22](#marqIdx_indx_940) [23](#marqIdx_indx_963) [24](#marqIdx_indx_987) [25](#marqIdx_indx_1007) [26](#marqIdx_indx_1009) [27](#marqIdx_indx_1010) [28](#marqIdx_indx_1016) [29](#marqIdx_indx_1019) [30](#marqIdx_indx_1023) [31](#marqIdx_indx_1025) [32](#marqIdx_indx_1026) [33](#marqIdx_indx_1029) [34](#marqIdx_indx_1048) [35](#marqIdx_indx_1121) [36](#marqIdx_indx_1138) [37](#marqIdx_indx_1140) [38](#marqIdx_indx_1143) [39](#marqIdx_indx_1151) [40](#marqIdx_indx_1171) [41](#marqIdx_indx_1179) [42](#marqIdx_indx_1186) [43](#marqIdx_indx_1437) [44](#marqIdx_indx_1439) [45](#marqIdx_indx_1420)

Gama, Vasco de[1](#marqIdx_indx_635) [2](#marqIdx_indx_650) [3](#marqIdx_indx_1070)

Garnier, Robert[1](#marqIdx_indx_505) [2](#marqIdx_indx_1331)

Gautier Dalché, Patrick[1](#marqIdx_indx_19) [2](#marqIdx_indx_1195) [3](#marqIdx_indx_433) [4](#marqIdx_indx_437) [5](#marqIdx_indx_454) [6](#marqIdx_indx_459) [7](#marqIdx_indx_461) [8](#marqIdx_indx_1280) [9](#marqIdx_indx_1284) [10](#marqIdx_indx_1304) [11](#marqIdx_indx_1308) [12](#marqIdx_indx_1311) [13](#marqIdx_indx_538) [14](#marqIdx_indx_559) [15](#marqIdx_indx_563) [16](#marqIdx_indx_1335) [17](#marqIdx_indx_1339) [18](#marqIdx_indx_1340) [19](#marqIdx_indx_1182) [20](#marqIdx_indx_1416)

Gelase[1](#marqIdx_indx_202)

Gemma Frisius, Rainer[1](#marqIdx_indx_494) [2](#marqIdx_indx_495) [3](#marqIdx_indx_1321) [4](#marqIdx_indx_1324) [5](#marqIdx_indx_1328)

Gerard of Cremona[1](#marqIdx_indx_319) [2](#marqIdx_indx_471)

Gerbert d'Aurillac[1](#marqIdx_indx_169)

Giet, Sylvain[1](#marqIdx_indx_215) [2](#marqIdx_indx_1258)

Giraudeau, Bernard[1](#marqIdx_indx_1174) [2](#marqIdx_indx_1412)

Girault, Simon[1](#marqIdx_indx_496) [2](#marqIdx_indx_1325)

Golius, Jacob[1](#marqIdx_indx_320)

Gossuin of Metz[1](#marqIdx_indx_392) [2](#marqIdx_indx_423)

Gregory of Nazianzus[1](#marqIdx_indx_267)

Gregory of Nyssa[1](#marqIdx_indx_209) [2](#marqIdx_indx_212) [3](#marqIdx_indx_266)

Gregory of Tours[1](#marqIdx_indx_181)

Gregory IX[1](#marqIdx_indx_376)

Gregory the Great[1](#marqIdx_indx_344) [2](#marqIdx_indx_645) [3](#marqIdx_indx_863)

Guillaume de Moerbeke[1](#marqIdx_indx_371)

Gutas, Dimitri[1](#marqIdx_indx_278)

Heers, Jacques[1](#marqIdx_indx_1187) [2](#marqIdx_indx_1189) [3](#marqIdx_indx_1417)

Heraclides of the Bridge[1](#marqIdx_indx_175)

Heraclitus[1](#marqIdx_indx_488)

Heredia, José Maria de[1](#marqIdx_indx_965)

Herodotus[1](#marqIdx_indx_112)

Hipparchus[1](#marqIdx_indx_50) [2](#marqIdx_indx_64) [3](#marqIdx_indx_89) [4](#marqIdx_indx_99) [5](#marqIdx_indx_122) [6](#marqIdx_indx_1211) [7](#marqIdx_indx_140) [8](#marqIdx_indx_264)

Homer[1](#marqIdx_indx_84) [2](#marqIdx_indx_101) [3](#marqIdx_indx_111) [4](#marqIdx_indx_1217) [5](#marqIdx_indx_205)

Honorius Augustodunensis[1](#marqIdx_indx_368) [2](#marqIdx_indx_382) [3](#marqIdx_indx_386) [4](#marqIdx_indx_450)

Hugo, Victor[1](#marqIdx_indx_947) [2](#marqIdx_indx_1047)

Hugues de Saint-Victor[1](#marqIdx_indx_387) [2](#marqIdx_indx_453) [3](#marqIdx_indx_455)

Humboldt, Alexander[1](#marqIdx_indx_786) [2](#marqIdx_indx_793) [3](#marqIdx_indx_800) [4](#marqIdx_indx_802) [5](#marqIdx_indx_803) [6](#marqIdx_indx_817) [7](#marqIdx_indx_1362) [8](#marqIdx_indx_1022) [9](#marqIdx_indx_1033)

Ibn Khallikan[1](#marqIdx_indx_303)

Idrīsī (al-)[1](#marqIdx_indx_300) [2](#marqIdx_indx_322) [3](#marqIdx_indx_324) [4](#marqIdx_indx_1276)

Irving, Washington[1](#marqIdx_indx_621) [2](#marqIdx_indx_648) [3](#marqIdx_indx_686) [4](#marqIdx_indx_710) [5](#marqIdx_indx_1347) [6](#marqIdx_indx_777) [7](#marqIdx_indx_784) [8](#marqIdx_indx_788) [9](#marqIdx_indx_789) [10](#marqIdx_indx_794) [11](#marqIdx_indx_805) [12](#marqIdx_indx_815) [13](#marqIdx_indx_830) [14](#marqIdx_indx_832) [15](#marqIdx_indx_841) [16](#marqIdx_indx_844) [17](#marqIdx_indx_848) [18](#marqIdx_indx_849) [19](#marqIdx_indx_851) [20](#marqIdx_indx_857) [21](#marqIdx_indx_866) [22](#marqIdx_indx_870) [23](#marqIdx_indx_871) [24](#marqIdx_indx_879) [25](#marqIdx_indx_885) [26](#marqIdx_indx_888) [27](#marqIdx_indx_892) [28](#marqIdx_indx_896) [29](#marqIdx_indx_920) [30](#marqIdx_indx_930) [31](#marqIdx_indx_1368) [32](#marqIdx_indx_1372) [33](#marqIdx_indx_1020) [34](#marqIdx_indx_1031) [35](#marqIdx_indx_1148)

Isḥāq b. Hunayn[1](#marqIdx_indx_281)

Jacob, Christian[1](#marqIdx_indx_113)

Jacob, François[1](#marqIdx_indx_1343)

James of Edessa[1](#marqIdx_indx_270) [2](#marqIdx_indx_273)

Jaoui, Agnès[1](#marqIdx_indx_1192) [2](#marqIdx_indx_1193)

John Chrysostom[1](#marqIdx_indx_239) [2](#marqIdx_indx_243) [3](#marqIdx_indx_249) [4](#marqIdx_indx_251) [5](#marqIdx_indx_643) [6](#marqIdx_indx_695) [7](#marqIdx_indx_861) [8](#marqIdx_indx_1086)

Jean Corbechon[1](#marqIdx_indx_390)

Jean de Mandeville[1](#marqIdx_indx_877) [2](#marqIdx_indx_1371)

John of Sacrobosco [1](#marqIdx_indx_1247) [2](#marqIdx_indx_372) [3](#marqIdx_indx_409) [4](#marqIdx_indx_410) [5](#marqIdx_indx_418) [6](#marqIdx_indx_422) [7](#marqIdx_indx_441) [8](#marqIdx_indx_469) [9](#marqIdx_indx_480) [10](#marqIdx_indx_1300) [11](#marqIdx_indx_1302) [12](#marqIdx_indx_1312) [13](#marqIdx_indx_1313) [14](#marqIdx_indx_540) [15](#marqIdx_indx_638) [16](#marqIdx_indx_1037)

John of Seville[1](#marqIdx_indx_318)

John Duns Scotus[1](#marqIdx_indx_798)

Jean Philopon[1](#marqIdx_indx_252) [2](#marqIdx_indx_253) [3](#marqIdx_indx_260) [4](#marqIdx_indx_283) [5](#marqIdx_indx_1270)

John Scotus Erigena[1](#marqIdx_indx_185) [2](#marqIdx_indx_213)

Jouanna, Arlette[1](#marqIdx_indx_1393)

Justin the Martyr[1](#marqIdx_indx_248)

Kennedy, Edward S.[1](#marqIdx_indx_304) [2](#marqIdx_indx_1274)

Kepler, Johannes[1](#marqIdx_indx_1118) [2](#marqIdx_indx_1183)

Keyser, Paul T.[1](#marqIdx_indx_1221) [2](#marqIdx_indx_1222)

Kirwan, Richard[1](#marqIdx_indx_715) [2](#marqIdx_indx_719)

Koestler, Arthur[1](#marqIdx_indx_1097) [2](#marqIdx_indx_1099) [3](#marqIdx_indx_1100) [4](#marqIdx_indx_1102) [5](#marqIdx_indx_1103) [6](#marqIdx_indx_1111) [7](#marqIdx_indx_1114) [8](#marqIdx_indx_1116) [9](#marqIdx_indx_1405) [10](#marqIdx_indx_1433) [11](#marqIdx_indx_1434)

Koyré, Alexandre[1](#marqIdx_indx_521) [2](#marqIdx_indx_1337)

Krivine, Hubert[1](#marqIdx_indx_722) [2](#marqIdx_indx_1353) [3](#marqIdx_indx_1385)

Kuhn, Thomas[1](#marqIdx_indx_1435)

Lactance[1](#marqIdx_indx_195) [2](#marqIdx_indx_196) [3](#marqIdx_indx_199) [4](#marqIdx_indx_235) [5](#marqIdx_indx_1252) [6](#marqIdx_indx_339) [7](#marqIdx_indx_537) [8](#marqIdx_indx_541) [9](#marqIdx_indx_543) [10](#marqIdx_indx_544) [11](#marqIdx_indx_548) [12](#marqIdx_indx_590) [13](#marqIdx_indx_591) [14](#marqIdx_indx_593) [15](#marqIdx_indx_596) [16](#marqIdx_indx_597) [17](#marqIdx_indx_613) [18](#marqIdx_indx_691) [19](#marqIdx_indx_702) [20](#marqIdx_indx_858) [21](#marqIdx_indx_865) [22](#marqIdx_indx_867) [23](#marqIdx_indx_883) [24](#marqIdx_indx_894) [25](#marqIdx_indx_1052) [26](#marqIdx_indx_1075) [27](#marqIdx_indx_1081) [28](#marqIdx_indx_1084) [29](#marqIdx_indx_1095) [30](#marqIdx_indx_1106)

Laffargue, Paul[1](#marqIdx_indx_954)

Lalouette, Jacqueline[1](#marqIdx_indx_1383) [2](#marqIdx_indx_1387)

La Popelinière Lancelot, Neighbor of[1](#marqIdx_indx_546)

Las Casas, Bartolomé de[1](#marqIdx_indx_834) [2](#marqIdx_indx_837) [3](#marqIdx_indx_839) [4](#marqIdx_indx_909) [5](#marqIdx_indx_1375)

Le Boeuffle, André[1](#marqIdx_indx_1248)

Lecointre, Guillaume[1](#marqIdx_indx_22) [2](#marqIdx_indx_1198)

Lefèvre d'Étaples, Jacques[1](#marqIdx_indx_413)

Le Goff, Jacques[1](#marqIdx_indx_978) [2](#marqIdx_indx_1389)

Leibniz, Gottfried[1](#marqIdx_indx_811)

Letronne, Antoine-Jean[1](#marqIdx_indx_687) [2](#marqIdx_indx_688) [3](#marqIdx_indx_699) [4](#marqIdx_indx_705) [5](#marqIdx_indx_709) [6](#marqIdx_indx_712) [7](#marqIdx_indx_724) [8](#marqIdx_indx_725) [9](#marqIdx_indx_727) [10](#marqIdx_indx_1352) [11](#marqIdx_indx_961) [12](#marqIdx_indx_1021)

Leucippe[1](#marqIdx_indx_487)

Leutze, Emanuel[1](#marqIdx_indx_969)

Libera, Alain de[1](#marqIdx_indx_1272) [2](#marqIdx_indx_394) [3](#marqIdx_indx_1288) [4](#marqIdx_indx_1292)

Lindberg, David C.[1](#marqIdx_indx_1287)

Lucretia[1](#marqIdx_indx_198) [2](#marqIdx_indx_1253) [3](#marqIdx_indx_361) [4](#marqIdx_indx_398)

Luther, Martin[1](#marqIdx_indx_415) [2](#marqIdx_indx_671) [3](#marqIdx_indx_981) [4](#marqIdx_indx_990) [5](#marqIdx_indx_999) [6](#marqIdx_indx_1147)

Macoudi (Masʿūdī)[1](#marqIdx_indx_306) [2](#marqIdx_indx_307)

Macrobe[1](#marqIdx_indx_54) [2](#marqIdx_indx_157) [3](#marqIdx_indx_158) [4](#marqIdx_indx_160) [5](#marqIdx_indx_164) [6](#marqIdx_indx_165) [7](#marqIdx_indx_167) [8](#marqIdx_indx_180) [9](#marqIdx_indx_189) [10](#marqIdx_indx_192) [11](#marqIdx_indx_1242) [12](#marqIdx_indx_1245) [13](#marqIdx_indx_1244) [14](#marqIdx_indx_451)

Magellan, Fernand de[1](#marqIdx_indx_9) [2](#marqIdx_indx_606) [3](#marqIdx_indx_611) [4](#marqIdx_indx_636) [5](#marqIdx_indx_651) [6](#marqIdx_indx_704) [7](#marqIdx_indx_706) [8](#marqIdx_indx_731) [9](#marqIdx_indx_1056) [10](#marqIdx_indx_1136) [11](#marqIdx_indx_1161) [12](#marqIdx_indx_1162) [13](#marqIdx_indx_1163)

Maillet de, Benoist[1](#marqIdx_indx_721)

Maimonides[1](#marqIdx_indx_288)

Malpangotto, Michela[1](#marqIdx_indx_472) [2](#marqIdx_indx_1314)

Mammar, Lydia[1](#marqIdx_indx_1413)

Mandressi, Rafael[1](#marqIdx_indx_1049) [2](#marqIdx_indx_1398)

Manso, Felipe[1](#marqIdx_indx_973)

Manṣūr (al)[1](#marqIdx_indx_275)

Marchena, Juan Perez de[1](#marqIdx_indx_902)

Sailor of Tyre[1](#marqIdx_indx_126) [2](#marqIdx_indx_914) [3](#marqIdx_indx_1168)

Martianus Capella[1](#marqIdx_indx_55) [2](#marqIdx_indx_1226) [3](#marqIdx_indx_170) [4](#marqIdx_indx_171) [5](#marqIdx_indx_172) [6](#marqIdx_indx_173) [7](#marqIdx_indx_176) [8](#marqIdx_indx_178) [9](#marqIdx_indx_179) [10](#marqIdx_indx_183) [11](#marqIdx_indx_184) [12](#marqIdx_indx_190) [13](#marqIdx_indx_193) [14](#marqIdx_indx_352) [15](#marqIdx_indx_436)

Martin, Thomas-Henri[1](#marqIdx_indx_1214) [2](#marqIdx_indx_1216)

Maury, Jean-Pierre[1](#marqIdx_indx_1123) [2](#marqIdx_indx_1406)

Mayaud, Pierre-Noël[1](#marqIdx_indx_1261) [2](#marqIdx_indx_1267) [3](#marqIdx_indx_1285) [4](#marqIdx_indx_556) [5](#marqIdx_indx_564) [6](#marqIdx_indx_1338)

Mazauric, Simone[1](#marqIdx_indx_1180) [2](#marqIdx_indx_1415)

Ma'mūn (al)[1](#marqIdx_indx_56) [2](#marqIdx_indx_276) [3](#marqIdx_indx_277) [4](#marqIdx_indx_301) [5](#marqIdx_indx_312)

Melanchthon, Philip[1](#marqIdx_indx_414) [2](#marqIdx_indx_672)

Michelet, Jules[1](#marqIdx_indx_573) [2](#marqIdx_indx_948) [3](#marqIdx_indx_975) [4](#marqIdx_indx_976) [5](#marqIdx_indx_977) [6](#marqIdx_indx_979) [7](#marqIdx_indx_980) [8](#marqIdx_indx_991) [9](#marqIdx_indx_1003) [10](#marqIdx_indx_1004) [11](#marqIdx_indx_1006) [12](#marqIdx_indx_1388) [13](#marqIdx_indx_1390) [14](#marqIdx_indx_1061) [15](#marqIdx_indx_1144) [16](#marqIdx_indx_1431)

Migne, Jacques-Paul[1](#marqIdx_indx_567) [2](#marqIdx_indx_568) [3](#marqIdx_indx_570) [4](#marqIdx_indx_1341)

Montfaucon, Bernard de[1](#marqIdx_indx_583) [2](#marqIdx_indx_585) [3](#marqIdx_indx_690) [4](#marqIdx_indx_1342)

Moore, Thomas[1](#marqIdx_indx_571)

Morelon, Régis[1](#marqIdx_indx_327) [2](#marqIdx_indx_1275) [3](#marqIdx_indx_1277)

Muqaddasī (al-)[1](#marqIdx_indx_299)

Navarrete, Martin Fernandez de[1](#marqIdx_indx_785)

Newton, Isaac[1](#marqIdx_indx_726) [2](#marqIdx_indx_810) [3](#marqIdx_indx_927) [4](#marqIdx_indx_1094) [5](#marqIdx_indx_1122)

Oresme, Nicole[1](#marqIdx_indx_443) [2](#marqIdx_indx_677)

Origen[1](#marqIdx_indx_207) [2](#marqIdx_indx_228) [3](#marqIdx_indx_236) [4](#marqIdx_indx_1254) [5](#marqIdx_indx_1262) [6](#marqIdx_indx_665)

Orose[1](#marqIdx_indx_449)

Ovide[1](#marqIdx_indx_426) [2](#marqIdx_indx_519)

Parmenides[1](#marqIdx_indx_72) [2](#marqIdx_indx_161) [3](#marqIdx_indx_1074) [4](#marqIdx_indx_1080)

Pepin the Short[1](#marqIdx_indx_555)

Perrault, Charles[1](#marqIdx_indx_618) [2](#marqIdx_indx_1346)

Peurbach, Georg[1](#marqIdx_indx_470) [2](#marqIdx_indx_474) [3](#marqIdx_indx_475) [4](#marqIdx_indx_476) [5](#marqIdx_indx_516)

Philolaüs[1](#marqIdx_indx_995)

Pico della Mirandola, John[1](#marqIdx_indx_204)

Pierre d'Ailly[1](#marqIdx_indx_432) [2](#marqIdx_indx_438) [3](#marqIdx_indx_439) [4](#marqIdx_indx_446) [5](#marqIdx_indx_680) [6](#marqIdx_indx_906) [7](#marqIdx_indx_918)

Pietro, from Abano[1](#marqIdx_indx_678)

Pinon, Laurent[1](#marqIdx_indx_520) [2](#marqIdx_indx_1332)

Plato[1](#marqIdx_indx_16) [2](#marqIdx_indx_23) [3](#marqIdx_indx_25) [4](#marqIdx_indx_32) [5](#marqIdx_indx_66) [6](#marqIdx_indx_129) [7](#marqIdx_indx_1199) [8](#marqIdx_indx_1200) [9](#marqIdx_indx_1204) [10](#marqIdx_indx_134) [11](#marqIdx_indx_155) [12](#marqIdx_indx_187) [13](#marqIdx_indx_197) [14](#marqIdx_indx_214) [15](#marqIdx_indx_284) [16](#marqIdx_indx_1235) [17](#marqIdx_indx_1237) [18](#marqIdx_indx_1240) [19](#marqIdx_indx_401) [20](#marqIdx_indx_403) [21](#marqIdx_indx_549) [22](#marqIdx_indx_600) [23](#marqIdx_indx_658) [24](#marqIdx_indx_809) [25](#marqIdx_indx_1104)

Pliny the Elder[1](#marqIdx_indx_61) [2](#marqIdx_indx_1223) [3](#marqIdx_indx_191) [4](#marqIdx_indx_194) [5](#marqIdx_indx_1251) [6](#marqIdx_indx_347) [7](#marqIdx_indx_351) [8](#marqIdx_indx_360) [9](#marqIdx_indx_366) [10](#marqIdx_indx_518) [11](#marqIdx_indx_1450)

Plutarch[1](#marqIdx_indx_701)

Polybe[1](#marqIdx_indx_100)

Posidonius[1](#marqIdx_indx_48) [2](#marqIdx_indx_65) [3](#marqIdx_indx_90) [4](#marqIdx_indx_109) [5](#marqIdx_indx_1219) [6](#marqIdx_indx_603)

Proclus[1](#marqIdx_indx_370)

Procopius of Gaza[1](#marqIdx_indx_246) [2](#marqIdx_indx_1265) [3](#marqIdx_indx_696)

Proudhon, Pierre-Joseph[1](#marqIdx_indx_942) [2](#marqIdx_indx_1382)

Ptolemy[1](#marqIdx_indx_52) [2](#marqIdx_indx_106) [3](#marqIdx_indx_117) [4](#marqIdx_indx_118) [5](#marqIdx_indx_120) [6](#marqIdx_indx_123) [7](#marqIdx_indx_125) [8](#marqIdx_indx_127) [9](#marqIdx_indx_130) [10](#marqIdx_indx_166) [11](#marqIdx_indx_174) [12](#marqIdx_indx_263) [13](#marqIdx_indx_271) [14](#marqIdx_indx_274) [15](#marqIdx_indx_296) [16](#marqIdx_indx_297) [17](#marqIdx_indx_308) [18](#marqIdx_indx_316) [19](#marqIdx_indx_325) [20](#marqIdx_indx_346) [21](#marqIdx_indx_419) [22](#marqIdx_indx_434) [23](#marqIdx_indx_440) [24](#marqIdx_indx_444) [25](#marqIdx_indx_445) [26](#marqIdx_indx_468) [27](#marqIdx_indx_853) [28](#marqIdx_indx_913) [29](#marqIdx_indx_1040) [30](#marqIdx_indx_1058) [31](#marqIdx_indx_1065) [32](#marqIdx_indx_1076) [33](#marqIdx_indx_1082) [34](#marqIdx_indx_1132) [35](#marqIdx_indx_1167)

Ptolemy II[1](#marqIdx_indx_45)

Pythagoras [1](#marqIdx_indx_71) [2](#marqIdx_indx_994)

Pytheas[1](#marqIdx_indx_58) [2](#marqIdx_indx_69) [3](#marqIdx_indx_102)

Raban Maur[1](#marqIdx_indx_367) [2](#marqIdx_indx_381)

Rabelais, François[1](#marqIdx_indx_539) [2](#marqIdx_indx_1028)

Randels, William G. R[1](#marqIdx_indx_1243) [2](#marqIdx_indx_1068) [3](#marqIdx_indx_1077) [4](#marqIdx_indx_1400)

Regiomontanus (Johannes Müller)[1](#marqIdx_indx_317) [2](#marqIdx_indx_473) [3](#marqIdx_indx_1038)

Resnais, Alain[1](#marqIdx_indx_1191)

Ribémont, Bernard[1](#marqIdx_indx_219) [2](#marqIdx_indx_1290) [3](#marqIdx_indx_1294) [4](#marqIdx_indx_1296)

Robert de Courçon[1](#marqIdx_indx_377)

Roger Bacon[1](#marqIdx_indx_442) [2](#marqIdx_indx_797)

Roger II of Sicily[1](#marqIdx_indx_323)

Roller, Duane W.[1](#marqIdx_indx_1208) [2](#marqIdx_indx_1213)

Roselly de Lorgues, Antoine[1](#marqIdx_indx_755) [2](#marqIdx_indx_758) [3](#marqIdx_indx_762) [4](#marqIdx_indx_765) [5](#marqIdx_indx_768) [6](#marqIdx_indx_771) [7](#marqIdx_indx_774) [8](#marqIdx_indx_776) [9](#marqIdx_indx_778) [10](#marqIdx_indx_782) [11](#marqIdx_indx_791) [12](#marqIdx_indx_819) [13](#marqIdx_indx_821) [14](#marqIdx_indx_822) [15](#marqIdx_indx_823) [16](#marqIdx_indx_831) [17](#marqIdx_indx_840) [18](#marqIdx_indx_842) [19](#marqIdx_indx_843) [20](#marqIdx_indx_854) [21](#marqIdx_indx_881) [22](#marqIdx_indx_887) [23](#marqIdx_indx_889) [24](#marqIdx_indx_897) [25](#marqIdx_indx_900) [26](#marqIdx_indx_903) [27](#marqIdx_indx_931) [28](#marqIdx_indx_1361) [29](#marqIdx_indx_1363) [30](#marqIdx_indx_1367) [31](#marqIdx_indx_1373)

Rows, John[1](#marqIdx_indx_460)

Russell, Jeffrey Burton[1](#marqIdx_indx_18) [2](#marqIdx_indx_652) [3](#marqIdx_indx_876)

Scheuchzer, Jean-Jacques[1](#marqIdx_indx_1266)

Schiappa, Marlène[1](#marqIdx_indx_3)

Schmitt, Charles[1](#marqIdx_indx_1043) [2](#marqIdx_indx_1396)

Schönberg, Nicolas[1](#marqIdx_indx_524)

Scott, Ridley[1](#marqIdx_indx_1164)

Seneca[1](#marqIdx_indx_507)

Sergius of Reshʿaynā[1](#marqIdx_indx_279)

Severe Sebokht[1](#marqIdx_indx_269)

Severian of Gabala[1](#marqIdx_indx_244) [2](#marqIdx_indx_697) [3](#marqIdx_indx_1108)

Silvi, Christine[1](#marqIdx_indx_425) [2](#marqIdx_indx_1303)

Simaan, Arkan[1](#marqIdx_indx_1402)

Simplicius[1](#marqIdx_indx_35)

Sisebut[1](#marqIdx_indx_397) [2](#marqIdx_indx_399)

Solignac, Aimé[1](#marqIdx_indx_231) [2](#marqIdx_indx_1264)

Stobée[1](#marqIdx_indx_75)

Strabo[1](#marqIdx_indx_51) [2](#marqIdx_indx_60) [3](#marqIdx_indx_91) [4](#marqIdx_indx_98) [5](#marqIdx_indx_105) [6](#marqIdx_indx_107) [7](#marqIdx_indx_121) [8](#marqIdx_indx_1212) [9](#marqIdx_indx_1225) [10](#marqIdx_indx_1227) [11](#marqIdx_indx_1449)

Talavera, Hernando de[1](#marqIdx_indx_829) [2](#marqIdx_indx_907) [3](#marqIdx_indx_923)

Taton, René[1](#marqIdx_indx_523) [2](#marqIdx_indx_1333)

Thales[1](#marqIdx_indx_77)

Themistius[1](#marqIdx_indx_294)

Theodore of Mopsueste[1](#marqIdx_indx_242) [2](#marqIdx_indx_255) [3](#marqIdx_indx_261)

Theodoret de Cyr[1](#marqIdx_indx_245)

Theodoric[1](#marqIdx_indx_357)

Theon of Smyrna[1](#marqIdx_indx_53) [2](#marqIdx_indx_1224) [3](#marqIdx_indx_131) [4](#marqIdx_indx_132) [5](#marqIdx_indx_137) [6](#marqIdx_indx_138) [7](#marqIdx_indx_143) [8](#marqIdx_indx_145) [9](#marqIdx_indx_147) [10](#marqIdx_indx_149) [11](#marqIdx_indx_152) [12](#marqIdx_indx_154) [13](#marqIdx_indx_156) [14](#marqIdx_indx_186) [15](#marqIdx_indx_291) [16](#marqIdx_indx_1234) [17](#marqIdx_indx_1236) [18](#marqIdx_indx_1239) [19](#marqIdx_indx_354)

Theophylact[1](#marqIdx_indx_250)

Thierry de Chartres[1](#marqIdx_indx_383)

Thomas Aquinas[1](#marqIdx_indx_375) [2](#marqIdx_indx_385) [3](#marqIdx_indx_668)

Thomas de Cantimpré[1](#marqIdx_indx_391)

Thrasylle[1](#marqIdx_indx_136)

Tort, Patrick[1](#marqIdx_indx_1438) [2](#marqIdx_indx_1419)

Toscanelli, Paolo[1](#marqIdx_indx_639) [2](#marqIdx_indx_641)

Tostado, Alonso[1](#marqIdx_indx_605)

Vagnon, Emmanuelle[1](#marqIdx_indx_452) [2](#marqIdx_indx_1307) [3](#marqIdx_indx_1309)

Verne, Jules[1](#marqIdx_indx_1155)

Vespucci, Amerigo[1](#marqIdx_indx_610) [2](#marqIdx_indx_736) [3](#marqIdx_indx_739) [4](#marqIdx_indx_741) [5](#marqIdx_indx_744) [6](#marqIdx_indx_780) [7](#marqIdx_indx_1071)

Vignaud, Laurent-Henry[1](#marqIdx_indx_1364) [2](#marqIdx_indx_1018) [3](#marqIdx_indx_1391) [4](#marqIdx_indx_1392)

Vinet, Élie[1](#marqIdx_indx_417)

Virgil[1](#marqIdx_indx_554) [2](#marqIdx_indx_562) [3](#marqIdx_indx_566) [4](#marqIdx_indx_572) [5](#marqIdx_indx_574) [6](#marqIdx_indx_633)

Voltaire[1](#marqIdx_indx_206) [2](#marqIdx_indx_240) [3](#marqIdx_indx_532) [4](#marqIdx_indx_588) [5](#marqIdx_indx_589) [6](#marqIdx_indx_592) [7](#marqIdx_indx_599) [8](#marqIdx_indx_607) [9](#marqIdx_indx_612) [10](#marqIdx_indx_631) [11](#marqIdx_indx_707) [12](#marqIdx_indx_728) [13](#marqIdx_indx_1344) [14](#marqIdx_indx_735) [15](#marqIdx_indx_743) [16](#marqIdx_indx_921) [17](#marqIdx_indx_1355) [18](#marqIdx_indx_1377) [19](#marqIdx_indx_956) [20](#marqIdx_indx_1384)

Watt, James[1](#marqIdx_indx_807)

Whiston, William[1](#marqIdx_indx_714) [2](#marqIdx_indx_718)

White, Andrew Dickinson[1](#marqIdx_indx_21) [2](#marqIdx_indx_653) [3](#marqIdx_indx_656) [4](#marqIdx_indx_661) [5](#marqIdx_indx_666) [6](#marqIdx_indx_670) [7](#marqIdx_indx_675) [8](#marqIdx_indx_683) [9](#marqIdx_indx_1351) [10](#marqIdx_indx_962) [11](#marqIdx_indx_1030) [12](#marqIdx_indx_1386)

Whitehead, Alfred North[1](#marqIdx_indx_1113)

Xenophane[1](#marqIdx_indx_76)

Yaʿqūbī (al-)[1](#marqIdx_indx_298)

Zechariah (saint)[1](#marqIdx_indx_552) [2](#marqIdx_indx_557) [3](#marqIdx_indx_560) [4](#marqIdx_indx_569) [5](#marqIdx_indx_579)

Zweig, Stefan[1](#marqIdx_indx_1160) [2](#marqIdx_indx_1411)

This electronic edition of the book

The Flat Earth

by Violaine Giacomotto-Charra and Sylvie Nony

was completed on October 8, 2021

by IGS-CP.

It is based on the paper edition of the same book

(ISBN 978-2-251-45223-4).